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Final Facilities Plan/Program and Summary of Final EIS/EIR, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area

Los Angeles-Orange County Metropolitan Area Project, Whittier, CA

Prepared for

Environmental Protection Agency
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PROPOSED SLUDGE MANAGEMENT PROGRAM FOR THE LOS ANGELES/ORANGE COUNTY METROPOLITAN AREA

FINAL FACILITIES PLAN/PROGRAM AND SUMMARY OF FINAL EIS/EIR

LA/OMA PROJECT

EPA United States Environmental Protection Agency

Region IX
215 Fremont St.
San Francisco, Ca. 94105

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Analysis of ocean disposal systems, other than for the NEPA-CEQA No Project Alternative was not studied using EPA and SWRCB funds. Funding for study of deep ocean outfalls and barge disposal was provided by the City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts.

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LA/OMA Project
P.O. Box 4998
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A proposed program has been selected to serve the sludge management needs of the City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts. The proposed program provides for complete cessation of ocean discharge of sludge and recovery of useable resources from the sludge. For the City of Los Angeles, a system of dehydration and thermal processing for volume reduction and energy recovery has been selected. For the Los Angeles County Sanitation Districts, a combination of dehydration and thermal processing for volume reduction and energy recovery, advanced windrow composting and recycling, and landfill disposal of dewatered sludge has been selected. Truck transport of dewatered sludge to an offsite location for composting/air drying has been selected for the Orange County Sanitation Districts. Due to public comment, additional alternative sites for the Orange County Sanitation Districts' facilities will be examined in a Supplemental Draft and Final EIS/EIR. Certain demonstration studies are also identified for each agency. Thermal processing systems will be fitted with advanced air pollution control systems and will comply with the requirements of the South Coast Air Quality Management District.

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ABSTRACT

FINAL FACILITIES PLAN/PROGRAM AND SUMMARY OF FINAL ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT FOR PROPOSED SLUDGE MANAGEMENT PROGRAM FOR THE LOS ANGELES/ORANGE COUNTY METROPOLITAN AREA OF CALIFORNIA

A proposed program has been selected to serve the sludge management needs of the City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts. The proposed program provides for complete cessation of ocean discharge of sludge and recovery of useable resources from the sludge. For the City of Los Angeles, a system of dehydration and thermal processing for volume reduction and energy recovery has been selected. For the Los Angeles County Sanitation Districts, a combination of dehydration and thermal processing for volume reduction and energy recovery, advanced windrow composting and recycling, and landfill disposal of dewatered sludge has been selected. Truck transport of dewatered sludge to an offsite location for composting/air drying has been selected for the Orange County Sanitation Districts. Due to public comment, additional alternative sites for the Orange County Sanitation Districts facilities will be examined in a Supplemental Draft and Final EIS/EIR. Certain demonstration studies are also identified for each agency. Thermal processing systems will be fitted with advanced air pollution control systems and will comply with the requirements of the South Coast Air Quality Management District.

PARTICIPATING AGENCY LOCATIONS

City of Los Angeles	Bureau of Engineering City Hall, Room 800 200 North Spring Street Los Angeles, California 90012	213-485-3071
Los Angeles County Sanitation Districts	Technical Services Department 1955 Workman Mill Road Whittier, California 90607	213-699-7411
Orange County Sanitation Districts	Chief Engineer 10844 Ellis Avenue Fountain Valley, California 92708	714-962-2411
State Water Resources Control Board	Division of Water Quality 2014 "T" Street Sacramento, California 95801	916-445-7971
Environmental Protection Agency	Region IX 215 Fremont Street San Francisco, California 94104	415-556-8037

FOREWORD

This Final Facilities Plan and Summary of the Environmental Impact Statement (EIS) and Environmental Impact Report (EIR) has been prepared for the municipal wastewater sludge management program for the Los Angeles/Orange County Metropolitan Area of California. Both the Draft and Final EIS/EIR have been prepared in accordance with the National Environmental Policy Act and California Environmental Quality Act and regulations issued pursuant thereto. The Draft and Final EIS/EIR and Facilities Plan have been prepared jointly by the United States Environmental Protection Agency, City of Los Angeles, Los Angeles County Sanitation Districts, Orange County Sanitation Districts, and California State Water Resources Control Board, acting through the Regional Wastewater Solids Management Program for the Los Angeles/Orange County Metropolitan Area (LA/OMA Project).

The Final EIS/EIR consists of two parts:

VOLUME I: "Draft Environmental Impact Statement/Environmental Impact Report, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area", April 1980, and appendices thereto.

VOLUME II: "Final Environmental Impact Statement/Environmental Impact Report, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area", October 1980, and appendices thereto.

The Final Facilities Plan consists of two parts:

VOLUME I: "Draft Facilities Plan/Program, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area", April 1980.

VOLUME II: Final Facilities Plan/Program and Summary of Final Environmental Impact Statement/Report, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area", October 1980.

LA/OMA PROJECT POLICY BOARD

Mr. Neil Dunham
Deputy Executive Director
State Water Resources Control Board

Mr. Richard A. Coddington
Chief, California Branch, Water Division
Region IX, U.S. Environmental Protection Agency

Mr. Donald C. Tillman
City Engineer
City of Los Angeles

Mr. Walter E. Garrison
Chief Engineer and General Manager
County Sanitation Districts of Los Angeles County

Mr. Fred A. Harper
General Manager
County Sanitation Districts of Orange County

LA/OMA PROJECT STAFF REVIEW COMMITTEE

Ms. Ann Godfrey
Project Officer
Region IX, U.S. Environmental Protection Agency

Mr. Mel Holland
Assistant Chief, Division of Water Quality
State Water Resources Control Board

Mr. Robert S. Horii
Deputy City Engineer
City of Los Angeles

Mr. Robert P. Miele
Head, Technical Services Department
County Sanitation Districts of Los Angeles County

Mr. Ray Lewis
Chief Engineer
County Sanitation Districts of Orange County

LA/OMA PROJECT STAFF

Bill Davis
Project Manager

Roger T. Haug, Ph.D.
Senior Engineer

Christine A. Harris
Public Affairs Officer

M. Phillip Lo, D.Env.
Project Engineer

Cindy Geter
Assistant Public Affairs Officer

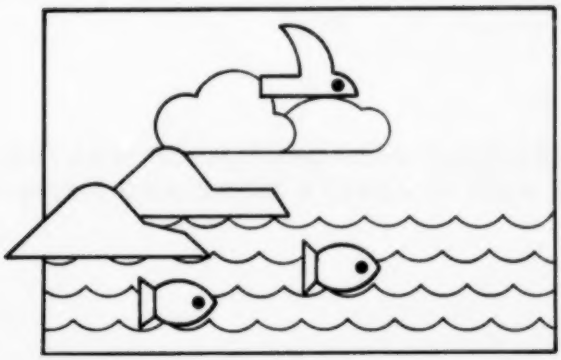
Greg Jowyk
Graphic Artist

Alma Rios
Secretary to the Project Manager

Jan Tanori
Secretary

Lynda Hershey
Secretary

OCTOBER 1980



Participating Agencies

U.S. Environmental Protection Agency (Region IX)

California State Water Resources Control Board

City of Los Angeles

Los Angeles County Sanitation Districts

Orange County Sanitation Districts

GOALS

ENVIRONMENTALLY, SOCIALLY, AND ECONOMICALLY COST EFFECTIVE RECOVERY OF RESOURCES FROM WASTEWATER SLUDGES

RELIABLE MANAGEMENT OF WASTEWATER SLUDGE TO MINIMIZE PUBLIC HEALTH RISKS AND ENVIRONMENTAL DEGRADATION

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FINAL FACILITIES PLAN/PROGRAM AND SUMMARY OF FINAL ENVIRONMENTAL IMPACT STATEMENT/REPORT

Sludge management in the Los Angeles/Orange County Metropolitan Area (LA/OMA) is the responsibility of the City of Los Angeles (CLA), County Sanitation Districts of Los Angeles County (LACSD), and County Sanitation Districts of Orange County (OCSD). Together, these three operating agencies treat approximately one billion gallons per day of wastewater produced by the some 8,000,000 persons living in the metropolitan area. The LA/OMA area accounts for about one-half the sludge produced in the state of California.

Like other large urban communities, the Area has confronted problems associated with management of residuals produced from treatment of wastewater. The proposed management plan is the culmination of efforts which began in late 1974 with the execution of Joint Powers Agreement among the LA/OMA operating agencies. Region IX of the U.S. Environmental Protection Agency (EPA) and the California State Water Resources Control Board (SWRCB), together with the three operating agencies, have provided continuing policy guidance for the Project through a five member Policy Board. A "Joint Goals Statement" approved by the Policy Board in 1975 established the goal of developing a long-term plan, including an implementation strategy, to use or dispose of residual solids resulting from industrial and municipal wastewater treatment in the Los Angeles/Orange County Metropolitan Area in an environmentally, economically and socially acceptable manner. Work began in 1975 with preparation of a work plan and has resulted in the development of a proposed management program/facilities plan and a final environmental impact statement/report for the proposed facilities.

For the City of Los Angeles, a system of dehydration and thermal processing for volume reduction and energy recovery has been selected. For the Los Angeles County Sanitation Districts, a combination of dehydration and thermal processing for volume reduction and energy recovery, advanced windrow composting and recycling, and landfill disposal of dewatered sludge has been selected. Truck transport of dewatered sludge to an offsite location for composting/air drying has been selected for the Orange County Sanitation Districts. Due to public comment, additional alternative sites for the OCSD facilities will be examined in a Supplemental Draft and Final EIS/EIR. Certain demonstration studies are also identified for each agency. Thermal processing systems will be fitted with advanced air pollution control systems and will comply with the requirements of the South Coast Air Quality Management District. The selected facilities will provide for management of both primary and secondary sludges and will result in significant resource recovery through production of electricity and steam from a renewable organic source and through production of compost products.

EPA, the State of California, City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts concur in the selected sludge management program and find such program to be environmentally sound. The selected program provides for compliance with Federal and State laws and regulations and provides for recovery of usable resources energy and soil amendment products from sludges produced by the Los Angeles/Orange County Metropolitan Area. Except as described below, all practicable means to avoid or minimize environmental harm arising from the selected sludge management program have been adopted and are included in the selected program:

City of Los Angeles: Changes in visual character, and public sector expenditures.

Los Angeles County Sanitation Districts: Changes in visual character, and public sector expenditures.

Orange County Sanitation Districts: Public sector expenditures, and others as may be identified by Supplemental EIS/EIR.

Project reports will be prepared by each of the operating agencies as an initial step in implementation of the selected program and will detail specific measures to minimize construction related impacts.

EPA and the State of California find that ocean disposal of sludge, containing significant concentrations of toxicants[1/] in a manner which results in substantial accumulation of solids on the ocean bottom, has significant avoidable environmental consequences. Current and projected sludge characteristics for LA/OMA operating agencies and current outfall systems have resulted in persistent significant public health concerns associated with consumption of seafood containing elevated concentrations of trace organic chemicals.

The selected sludge management program benefits the marine and human environment by elimination of sludge discharges to the ocean which are the major contributors of trace organics to the Southern California Bight. Additionally, benefits associated with conservation of resources are also realized. The selected program also provides for minimal nuisance potential.

The selected sludge management program provides for sound management of the sludges that will be produced by secondary treatment of wastewaters and provides flexibility to accommodate decisions regarding applications for waiver of secondary treatment requirements that have been filed by each of the operating agencies. The selected sludge management program is not growth inducing since facilities will be sized to correspond to prior wastewater treatment capacity decisions. Wastewater treatment plant capacity decisions are not a part of the selected sludge management program.

Industrial pretreatment programs can effectively reduce certain undesirable heavy metals to levels which enhance the resource potential of the sludge. Programs to provide maximum practicable reductions will be undertaken by the City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts.

1/ Toxicants are considered to be present in significant concentrations when they cause undesirable effects, including the possibility of danger associated with bioaccumulation in marine organisms.

In view of the comments received regarding location of composting/air drying facilities to serve Orange County Sanitation Districts, it is advisable to consider alternative locations that have been identified as a result of public comment. A Supplemental EIS/EIR will be prepared to provide the basis for selection of the site for location of selected processing facilities to serve Orange County Sanitation Districts.

EPA proposes to offer grant assistance for design and construction of the selected sludge management program in the amount of 75 percent of the eligible costs as determined by the California State Water Resources Control Board. EPA intends to fund construction based in part upon the facilities planning principles enunciated in the Draft EIS/EIR and summarized in this chapter of the Final EIS/EIR. The State Water Resources Control Board proposes to offer grant assistance for design and construction of the selected sludge management program in the amount of 12½ percent of the eligible costs as determined by the Board.

To the extent that funds are available, EPA and the State Water Resources Control Board propose to offer grant assistance in the amount of 10 percent of eligible costs, as determined by the Board, for application of innovative or alternative systems included in the selected sludge management program.

The City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts propose to finance all costs of design and construction of the selected sludge management program to the extent that such costs are not eligible for grant assistance from the State of California and EPA.

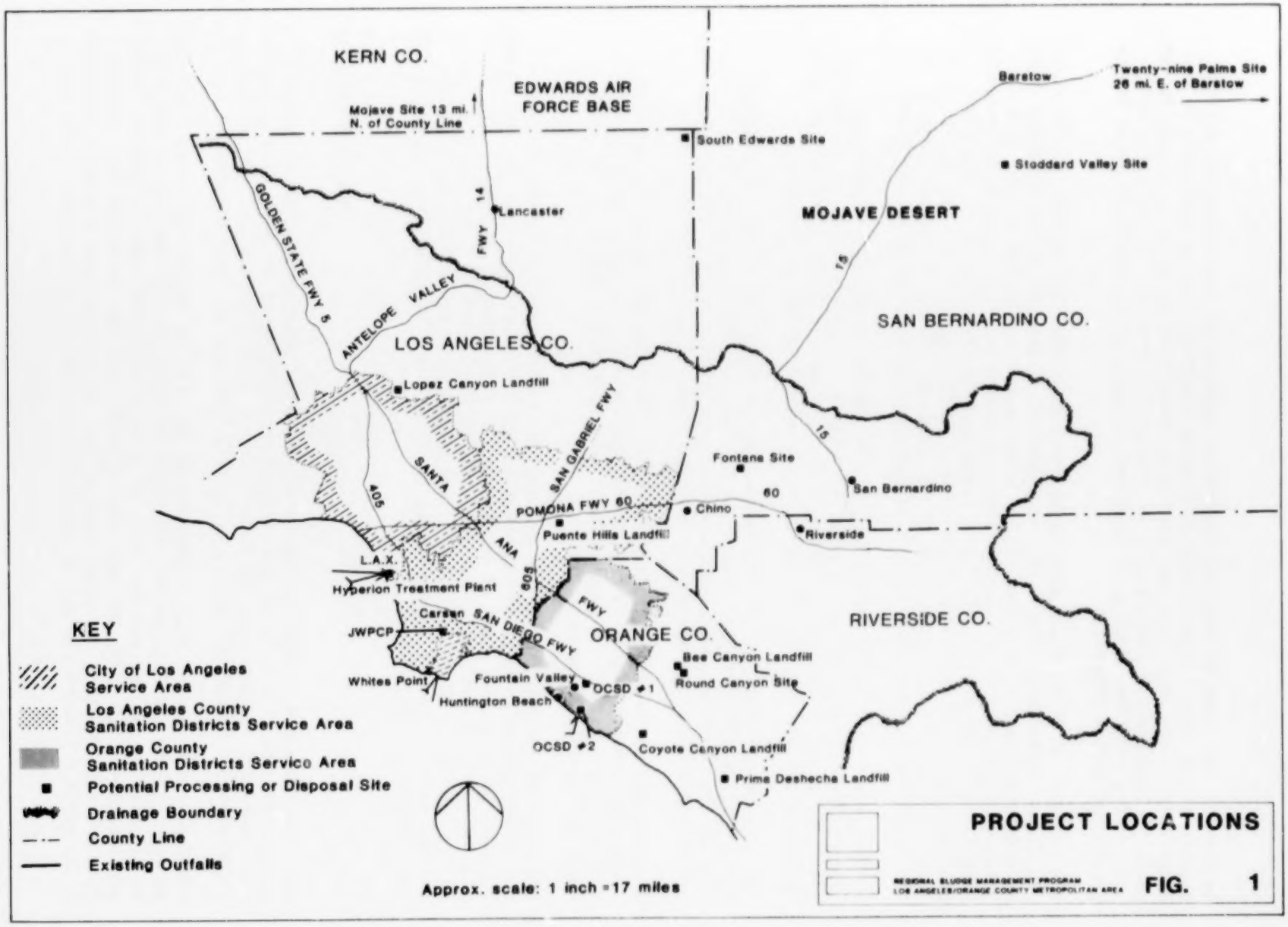
EPA proposes to condition grants for design and construction of the selected sludge management program to require compliance with all local permitting requirements and explicitly require compliance with requirements of the South Coast Air Quality Management District.

EPA proposes to condition grants for design and construction of the selected sludge management program on the submittal of a plan of operation for review and approval prior to the start of construction. EPA proposes to require that the plan of operation include explicit identification of actions for start-up and initial operation of the selected sludge management facilities, including provisions for training of agency forces or other means for effective operation and maintenance of facilities.

BACKGROUND

Wastewater systems managed by the three operating agencies are large regionalized systems. The bulk of the wastewater is processed at three large treatment complexes located near the Pacific Ocean. (See Figure 1 for geographical information). Sludge processing is largely confined to these complexes.

The Hyperion Treatment Plant, operated by the CLA, is located on a 144 acre site adjacent to the Los Angeles International Airport. Rated capacity of the plant is 420 million gallons per day (MGD) of primary treatment and 100 MGD of secondary treatment. In 1978, the reported influent flow was about 345 MGD. Sludge from primary treatment and about one-half of the sludge from secondary treatment (i.e. waste activated sludge) is currently anaerobically digested. Total undi-


KERN CO.
EDWARDS AIR FORCE BASE
Mojave Site 13 mi. N. of County Line
South Edwards Site
Barstow
Twenty-nine Palms Site 26 mi. E. of Barstow
Stoddard Valley Site
MOJAVE DESERT
Lancaster
GOLDEN STATE FWY 5
14 FWY
ANTELOPE VALLEY
LOS ANGELES CO.
SAN BERNARDINO CO.
15
Lopez Canyon Landfill
SAN GABRIEL FWY
Fontana Site
San Bernardino
60
405
SANTA ANA
POMONA FWY 60
Chino
Puente Hills Landfill
Riverside
L.A.X.
Hyperion Treatment Plant
605
FWY
Carson
SAN DIEGO FWY
ORANGE CO.
RIVERSIDE CO.
JWPCP
Bee Canyon Landfill
Whites Point
Fountain Valley
OCSD #1
Round Canyon Site
Huntington Beach
OCSD #2
Coyote Canyon Landfill
Prima Deshecha Landfill
KEY
City of Los Angeles Service Area
Los Angeles County Sanitation Districts Service Area
Orange County Sanitation Districts Service Area
Potential Processing or Disposal Site
Drainage Boundary
County Line
Existing Outfalls
Approx. scale: 1 inch = 17 miles
PROJECT LOCATIONS
REGIONAL SLUDGE MANAGEMENT PROGRAM
LOS ANGELES/ORANGE COUNTY METROPOLITAN AREA
FIG. 1

gested sludge production at Hyperion in 1978 has been estimated to be about 339 dry tons per day. Digestion destroyed about 175 dry tons per day, and the remaining 164 dry tons were discharged to the Pacific Ocean through a seven-mile submarine outfall.

The Joint Water Pollution Control Plant located in the City of Carson is the major wastewater treatment complex operated by LACSD and has a rated capacity of 385 MGD for advanced primary treatment. The plant boundaries encompass a total of about 300 acres of which about 200 acres are available for wastewater system uses. Currently, no secondary treatment is provided, although secondary treatment facilities for 200 MGD of primary effluent are under construction and expected to be completed by 1983. Influent flow in 1978 was reported to be about 345 MGD. Sludges from five water reclamation plants in the Joint Outfall System are included in the influent flow to JWPCP. Primary sludge is anaerobically digested and dewatered with centrifuges. Centrate from dewatering is blended with treated effluent, chlorinated on a seasonal basis, and discharged to the ocean through the outfall system. In 1978, about 515 dry tons per day of undigested sludge was produced. After digestion, a total of about 330 dry tons per day remained for disposal via reuse, landfilling, and ocean outfall.

In 1978, OCSD collected and treated a total wastewater flow of about 191 MGD at the two plants which constitute the Joint Works. All flows receive primary treatment consisting of screening and sedimentation. Approximately 50 MGD of primary treated wastewater receives secondary treatment by means of the activated sludge process. Secondary treatment facilities for an additional 75 MGD of primary effluent are under construction and projected to be in operation in 1981. Sludge is presently anaerobically digested and dewatered with centrifuges. Dewatered sludge is trucked from the Joint Works to the Coyote Canyon Landfill in Orange County where it is air dried and landfilled. In 1978 about 150 dry tons per day of undigested primary and about 30 dry tons per day of raw waste activated sludge were produced. After digestion, a total of about 117 dry tons per day remained for disposal.

Projected sludge loads for the year 2000 are compared with 1978 levels in Table 1. The major increase in sludge should occur by year 2000 and year 2000 sludge volumes were selected as the basis for evaluation of alternatives. Projections for the Los Angeles County Sanitation Districts include primary and waste activated sludges from treatment of 150 MGD of wastewater at upstream water reclamation facilities which will be processed at the Joint Water Pollution Control Plant (JWPCP). Similarly, projections for the City of Los Angeles include primary and waste activated sludges from treatment of 115 MGD at upstream facilities which will be processed at Hyperion.

If a joint use facility serving all of Orange County is realized, the following year 2000 sludge loads from Southern Orange County Sanitation Agencies would be combined with sludges from OCSD for processing and disposal on land.

Aliso Water Management Agency	19 dry tons per day
Irvine Ranch Water District	30 dry tons per day
Southeast Regional Reclamation Authority	33 dry tons per day

TABLE 1

COMPARISON OF PROJECTED SLUDGE LOADS WITH 1978 LEVELS LA/OMA OPERATING AGENCIES

TREATMENT PLANT	SECONDARY TREATMENT LEVEL		YEAR 2000 SLUDGE LOADS					
	YEAR 2000 (MGD)	1978 (MGD)	PRIMARY (DTPD)(b)(g) (j)	WAS (a) (DTPD)(b)(g) (j)	TOTAL-RAW (DTPD)(b)(g) (j)	TOTAL DIGESTED (DTPD)(b)(h)(i)	1978 TOTAL DIGESTED (DTPD)(b)(h)	DIGESTED SLUDGE INCREASE (k) PERCENT
	FULL							
LACSD (c)	330	0	590	210	800	570	330	73
OCSD (d)	280	50	260	180	440	320	115	174
CLA (e)	400	100	320	220	540	390	165	138
Total	1,010		1,170	610	1,780	1,280	610	109
	MARINE							
LACSD	200		590	130	720	505	330	53
OCSD	150		260	95	355	250	115	114
CLA	150		320	85	405	280	165	71
Total	500		1,170	310	1,480	1,035	610	69

(a) Waste activated sludge resulting from secondary treatment.
(b) Dry tons per day.
(c) Joint Water Pollution Control Plant operated by Los Angeles County Sanitation Districts. Year 2000 projections provided by LACSD.
(d) Orange County Sanitation Districts - Joint Works.
(e) Hyperion Treatment Plant operated by the City of Los Angeles.
(f) Term used by LA/OMA Project to describe a level of secondary treatment that may be permitted pursuant to Section 301(h) of the Clean Water Act Amendments of 1977. The values shown have been assumed by LA/OMA Project only for purposes of evaluation of sludge management alternatives and should not be construed as approved pursuant to Section 301(h).
(g) Undigested Sludge.
(h) Total after anaerobic digestion.
(i) Includes sidestream recycle effects.
(j) Does not include sidestream recycle effects.
(k) Percent increase over 1978 levels projected to occur by year 2000.

Under conditions of full secondary treatment of wastewaters, year 2000 total digested sludge load is projected to be approximately double the digested sludge load in 1978. Each of the operating agencies have applied for Section 301(h) waivers of full secondary treatment. Sludge production under "marine secondary" treatment levels is also shown in Table 1. A 70 percent increase in digested sludge production over 1978 levels is projected under marine secondary conditions and, depending on the agency, ranges from 72 to 88 percent of the sludge produced under full secondary treatment conditions.

Existing sludge characteristics vary among the three operating agencies since each of the agencies operate large regional systems with a particular set of industrial contributors. In terms of current sludge characteristics, OCSD sludges are notably high in cadmium while LACSD sludges have considerably higher concentrations of lead, chromium, and DDT. Other chemical characteristics are comparable among the three operating agencies. Measurements indicate that chemical characteristics (in terms of heavy metals and trace organics) of digested primary sludges and undigested waste activated sludges are not markedly different.

Federal Water Pollution Control Act Amendments of 1977 mandate implementation of industrial source control programs to preclude discharge of substances to the sewerage system which would interfere with sludge reuse or disposal programs.

Significant reductions in most heavy metals concentrations in sludges appear achievable through application of pretreatment programs. Known metal plating industrial discharges offer the best prospects for immediate large scale reductions. Some heavy metals (mercury and arsenic) and chlorinated hydrocarbons (DDT and PCB) are not projected to change as a result of industrial pretreatment programs. Industrial pretreatment programs will not totally eliminate heavy metals from sludges. Domestic and uncontrollable sources currently exist and, as industrial contributions decline, will become a greater proportion of the total mass input to the treatment plants.

DEVELOPMENT OF THE PROPOSED PROGRAM

Due to the large number of sludge processing and ultimate disposal options, it was essential that the number of alternatives be reduced to a manageable number. As analysis continued, an increasing number of options were deferred from further consideration. Those remaining at the end of the analysis were used to formulate the proposed sludge management program.

Due to the broad scope and duration of the LA/OMA Project, the alternatives under investigation were periodically reorganized to facilitate the analysis. The first group of alternatives were termed candidate systems. Following a preliminary engineering analysis and initial site investigation, a number of options were deferred from further consideration. Those remaining were combined into six fundamental management concepts, termed Sludge Management Alternatives (SMA). Each concept incorporated a number of permutations so that the total number of systems being considered was still quite large. To facilitate the analysis, design criteria were developed for each unit process included in the SMA's and a computer program written to assist in the analysis. These tools allowed the engineering studies to be conducted in much greater depth, and were used in all subsequent analysis.

As part of the analysis of the SMA's, efforts were made to locate potentially suitable sites in the metropolitan area and in surrounding desert and agricultural areas. Combining site information with results of the engineering analysis, a number of systems were again deferred from further consideration. Those remaining were twelve alternative Sludge Management Projects (SMP). A number of options were incorporated into each SMP, but were reduced to a single option for each project. A description of the SMP's is presented in Table 2. Geographical information is provided in Figure 1. Each project was tied to specified sites for both processing and ultimate disposal. From the nearly infinite number of possible systems, the analysis identified twelve detailed treatment trains, transportation routes, and corresponding sites for processing, reuse or disposal.

The reduced number of management projects and the detail of their specification allowed serious consideration of all factors necessary to the decision making process. These considerations were broken into the four categories of quantitative engineering analysis, engineering practicability, environmental acceptability, and implementation potential. Public input was incorporated into the study as part of implementation potential.

TABLE 2

ALTERNATIVE SLUDGE MANAGEMENT PROJECTS

NUMBER	NAME	DESCRIPTION
1R1	Solar Drying Basins	Pipeline transport of liquid digested sludge to a location in the Mojave Desert for dewatering by shallow open air basins equipped with underdrains and lined with 2 feet of clay or equivalent. Percolate return to the LA/OMA urban area via pipeline. Solar dried sludge at 60 percent solids would be stockpiled the processing location until such time as a market for dried sludge products develops.
1R2	Desert Energy Project	Same as the Solar Drying Basins project (1R1) except that solar dried sludge would be combusted in a thermal reactor to achieve volume reduction and energy recovery. Residues disposed of at the processing location.
2R1	Centralized Dewatering and Composting	Pipeline transport of liquid digested sludge to a location in the Fontana area for mechanical dewatering and windrow composting. Market composted sludge through a recycle center. Landfill compost which cannot be marketed. Liquid sidestreams would be returned to the LA/OMA area by pipeline.
2S1	Decentralized Dewatering and Composting	Compost dewatered sludge in enclosed structures at the respective operating agency treatment plants. If needed, include dehydration for moisture control of feed material to compost system. Market composted sludge through recycle centers located at the plants. Landfill surplus compost.
2S1X	Round Canyon Composting/Air Drying	From OCSD only, truck haul dewatered sludge to a site in lower Round Canyon in eastern Orange County for processing by composting and air drying. Landfill disposal of dried sludge in Bee Canyon Landfill until adequate source control achieves acceptable sludge quality for recycling.
3S1	Energy Recovery from Sludge	Dehydrate dewatered sludge to about 95 percent solids prior to combustion for volume reduction and energy recovery. Truck haul residues to landfill.
3S2	Energy Recovery from Sludge and Solid Waste	Combine dewatered sludge with processed solid waste prior to combustion for volume reduction and energy recovery. Truck residues to a landfill.
3R1	Energy Recovery from Sludge and Dairy Waste	Same as Project 2R1 except that dewatered sludge would be dehydrated and combined with animal manure for combustion in a thermal reactor for volume reduction and energy recovery. Residues would be truck hauled to a landfill.
4S1	Deep Ocean Outfalls	Discharge screened digested sludge to the Southern California Bight through new sludge-only outfalls at depths of about 1,000 feet. Truck residuals to a landfill.
4R1	Barge Disposal	Pipeline transport of liquid digested sludge to a central location in the Long Beach/Los Angeles Harbor for barge disposal at sea. Disposal by dispersal over large areas about 60 miles offshore by means of a flexible pipe extended to depths of about 150 feet beneath the barge.
DS1	Truck Dewatered Sludge to Landfills	Truck haul dewatered sludge at 20-25 percent solids to sanitary landfills for disposal with incoming solid waste.
6S1	Baseline No-Project	Provides a basis for comparison of alternative SMP's and corresponds to the No-Project alternative required to be analyzed by NEPA and CEQA. Involves use of sludge facilities committed prior to December 31, 1978.

Note: Letter in project number indicates project type: R = regional alternative S= individual alternative.

A number of additional studies were conducted, the information from which was used in formulation and analysis of the Alternative Sludge Management Projects. Important among these were demonstration projects conducted by the LA/OMA Project and other special technical studies. Demonstration studies were conducted in the following areas: cultivation of crops on sludge amended soils, pyrolysis of refuse and sewage sludge, thermal pretreatment, composting, dewatering, dehydration, thermal gasification of dehydrated sludge, landfilling of dewatered sludge, and solar evaporation of liquid sludge.

Each of the alternative sludge management projects were analyzed by a team of LA/OMA Project staff and consultants. Comparative evaluation of the alternative sludge management projects was based upon consideration of: environmental acceptability in terms of potential benefits and adverse impacts and the ability to mitigate the latter; engineering practicability in terms of the qualitative factors of feasibility, flexibility, reliability, and occupational concerns; implementation potential in terms of anticipated regulatory compatibility, practicality, and public acceptance; quantitative characteristics consisting of economics, energy production and consumption, and estimates of direct mass emission rates of air pollutants.

Rankings of alternatives for each qualitative consideration were combined together with the ranking of quantitative characteristics for comparison of alternatives. From this comparison, the following conclusions were drawn regarding prospects for inclusion of the various alternatives in the proposed sludge management program for the Los Angeles/Orange County Metropolitan Area.

- Decentralized Dewatering and Composting (2S1 and 2S1X), Energy Recovery from sludge (3S1), and Truck Dewatered Cake to Landfill (DS1) would provide the best long-term prospects for inclusion in the Proposed Sludge Management Program.

- Energy Recovery from Sludge and Solid Waste (3S2) could, from a technical point of view, be implemented at some future date as an expansion of Project 3S1.

- Deep Ocean Outfalls (4S1) appeared to offer better prospects than barge Disposal (4R1), although additional study would be required before a definitive conclusion could be reached regarding either option.

- Solar Drying Basins (1R1), the Desert Energy Project (1R2), Centralized Dewatering and Composting (2R1), Energy Recovery from Sludge and Dairy Wastes (3R1), and the Baseline No-Project Alternative (6S1) were found to have the poorest prospects for sludge management.

The Proposed Sludge Management Program is a logical outgrowth of the analysis and comparative evaluation of alternatives, as well as consideration of the major factors associated with composting, energy recovery, and landfill disposal. Basic to the program is the concept of minimization of environmental, social, economic, and technological risks involved while providing flexibility to respond to changing requirements, current unknowns, and information gained through monitoring of initial performance of planned facilities. Detailed facility requirements were developed through application of those options determined to present the best long-term prospects to the unique situations associated with each operating agency.

The timeframe for implementation of the proposed sludge management program is composed of three phases. Phase I consists of sludge management planning by the LA/OMA Project and concludes with approval of the facilities plan and environmental documents by the State and EPA at the end of 1980. Phase II consists of design, construction, operation, and monitoring of sludge management facilities to firmly establish performance efficiencies and substantiate economic, environmental, and engineering projections while providing for acceptable management of sludge. Decisions regarding expansion, deletion, or replacement of facilities would be made at the conclusion of Phase II or after a reasonable period of operation has provided an adequate basis for such decision. Phase II is anticipated to be concluded within about 10 years after completion of Phase I. Phase III will consist of actions necessary to carry out decisions reached at the end of Phase II. Planning by the LA/OMA Project has defined currently available options based upon full secondary treatment of all wastewaters. These Phase III options therefore may also be exercised if full secondary treatment of all wastewaters is required prior to the end of Phase II.

PUBLIC PARTICIPATION AND DISCLOSURE

A public participation program, designed to encourage and provide opportunities for public involvement in the formulation of the proposed sludge management program, has been an ongoing activity since the early phases of the LA/OMA Project. The Joint Goal Statement, adopted by the LA/OMA Project Policy Board in 1975, included a charge to "include the broadest possible participation by the public as well as political and institutional interests."

Prior to the publication of the Draft EIS/EIR, a number of approaches were used to encourage public involvement. Information was disseminated through brochures and newsletters, publication of articles in journals and newspapers, presentations, and speaking engagements. A public hearing, public workshops, and numerous coordination meetings were held to brief interested citizens and agencies regarding Project activities and to provide opportunities for follow-up participation.

Wide distribution was made of the Draft EIS/EIR, the principal disclosure document leading to the selection of a sludge management program for the LA/OMA area. The complete Draft EIS/EIR was provided to about 500 persons and agencies throughout the United States and nearly 100 libraries in the LA/OMA area. Copies of the Summary Draft EIS/EIR were distributed to more than 3500 persons throughout the United States. A Public Hearing, consisting of three consecutive evening sessions at the individual treatment plant sites, was held to receive public comment on the Draft EIS/EIR. The period for public review and comment on the Draft EIS/EIR concluded as of close of business on July 21, 1980.

Public response to the Draft EIS/EIR was in the form of: letters written by public agencies, private organizations, and citizens; written testimony submitted as part of the record of the Public Hearing held on July 8, 9, 10, 1980; verbal comments presented at the Public Hearing and documented in the official transcript of the Public Hearing; and correspondence received after close of the public review period on July 21, 1980.

A total of 51 written comments were received during the public review period for the Draft EIS/EIR. Nearly 85% of the written comments were submitted by local and regional agencies, federal agencies, and interested citizens and organizations. A total of 25 persons presented verbal comments at the public hearing. Total attendance at the public hearing was 99 persons.

Major issues raised as a result of the public review process centered in the following areas:

- Need to avoid nuisance conditions (i.e. odor, noise, dust) which might arise from operation of the proposed facilities.
- A desire to minimize air quality and public health impacts.
- Concern over reliability of the proposed facilities.
- Questions regarding the cost and environmental impact of the proposed facilities compared to ocean disposal of sludge through existing outfalls.
- Site specific issues related to siting of the proposed faciliites for OCSD.

A Final EIS/EIR was prepared to respond to comments received as a result of public review of the Draft EIS/EIR and to inform the public of the outcome of the process. Each of the local operating agencies have assumed responsibility for providing opportunities for continuing involvement of those persons expressing interest in their respective programs.

SELECTED SLUDGE MANAGEMENT PROGRAM AND ENVIRONMENTAL IMPACT

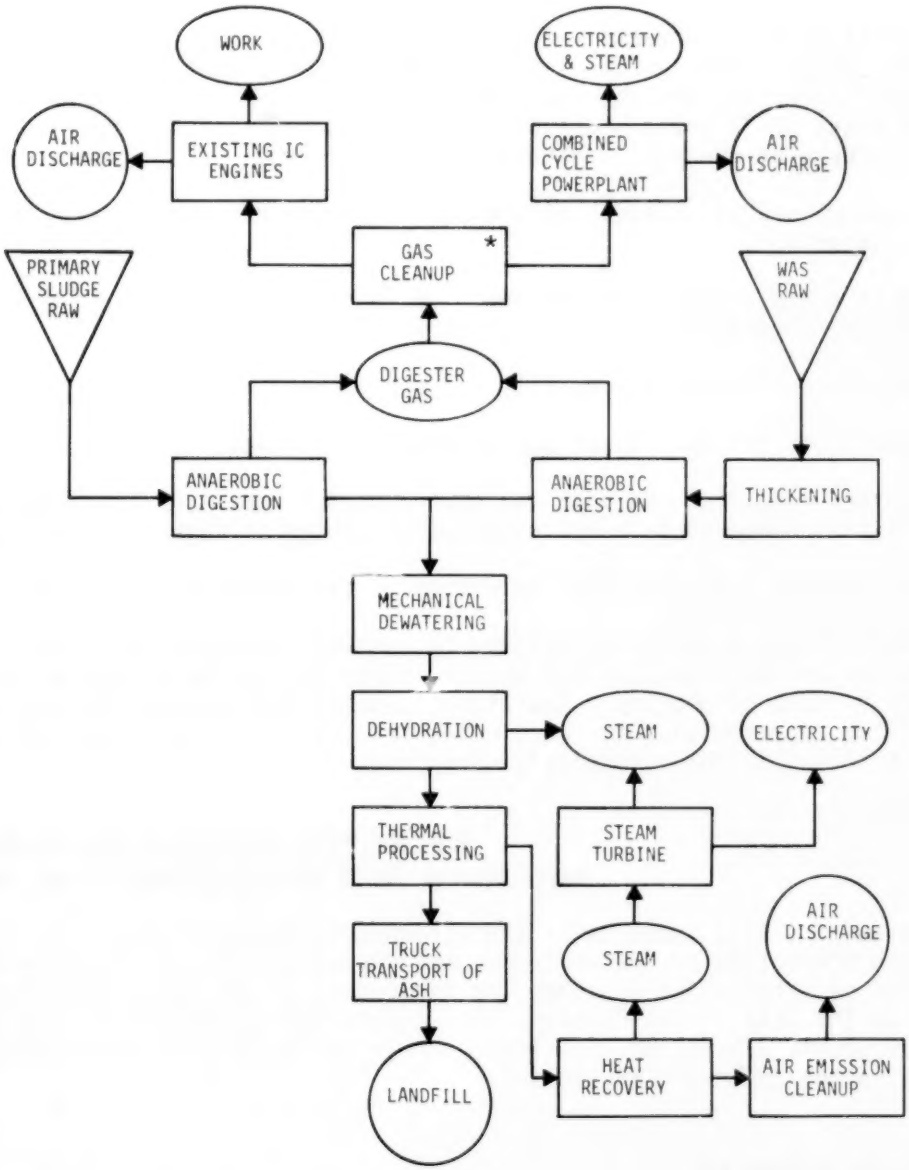
After review of public comments on the management program proposed in the Draft EIS/EIR and completion of the environmental review process, a sludge management program was selected which provides for management of the wastewater sludges produced by the City of Los Angeles, Los Angeles County Sanitation Districts, and Orange County Sanitation Districts. Projects for each of these agencies are described in the following sections.

CITY OF LOS ANGELES

Thermal processing of dehydrated, dewatered sludge has been found to be most feasible alternative for the City of Los Angeles. The project is compatible with applicable regulatory requirements, can be implemented within the existing treatment plant boundaries, involves minimal truck traffic, and provides for resource recovery through production of electricity and steam for use in the processing of wastewaters and sludges.

Project Description

A conceptual diagram of the selected facilities is presented in Figure 2. All waste activated sludge (WAS) will be thickened and anaerobically digested,



KEY

- INPUTS TO THE SYSTEM
- UNIT PROCESSES
- USEFUL PRODUCTS
- END POINTS OF THE SYSTEM

IC - INTERNAL COMBUSTION
WAS - WASTE ACTIVATED SLUDGE

*IF NEEDED TO ACHIEVE A NET EMISSION INCREASE OF 150 LBS/DAY SOX OR LESS.

NOTE: MECHANICAL COMPOSTING DEMO AT TERMINAL ISLAND TP NOT SHOWN

OVERVIEW OF FACILITIES REQUIREMENTS
CITY OF LOS ANGELES
REGIONAL SLUDGE MANAGEMENT PROGRAM
LOS ANGELES/ORANGE COUNTY METROPOLITAN AREA
FIG. 2

either separately or in combination with primary sludge (PS). Digested PS and WAS will be mechanically dewatered and dehydrated using the Carver-Greenfield drying process. Dried product from the dehydration process will be thermally processed for energy recovery. Energy from combustion will be extracted in a waste heat boiler. Steam will be used for electrical power generation in a steam turbine and for process applications in the dehydration system. Char and ash produced during thermal processing will be truck hauled to Lopez Canyon landfill or identified alternative sites for disposal. The project description remains essentially unchanged from that in the Draft EIS/EIR and Draft Facilities Plan. It is noted however that various thermal processing systems will be evaluated during design. Certain air pollution control mitigation measures have been added, however.

A number of decisions remain to be made concerning use of digester gas. Currently, some digester gas is sold directly to the Scattergood Power Plant with the remainder used primarily in internal combustion (IC) engine drives. The Phase II facilities include provision for construction of a combined cycle power generation system (CCP). A decision has not been made regarding the quantity of digester gas to be combusted in the combined cycle plant and the number of IC engine drives to be retired from service. At a minimum, sufficient IC engines would be retired to assure compliance with new source (air emission) review requirements. Remaining digester gas could be used in the combined cycle plant or processed for sale and off-site use. Decisions regarding the size of the combined cycle power plant and the extent of continued use of IC engines will be made early in the design phase of the program.

An advanced air cleanup train will be used to reduce emissions of atmospheric pollutants and to comply with Regulation IV and Regulation XIII, New Source Review (NSR) of the South Coast Air Quality Management District (SCAQMD). One means for compliance with NSR without resort to external offsets is projected using the following air pollution control strategies, however, the exact nature of the control system will be established as part of the permitting process.

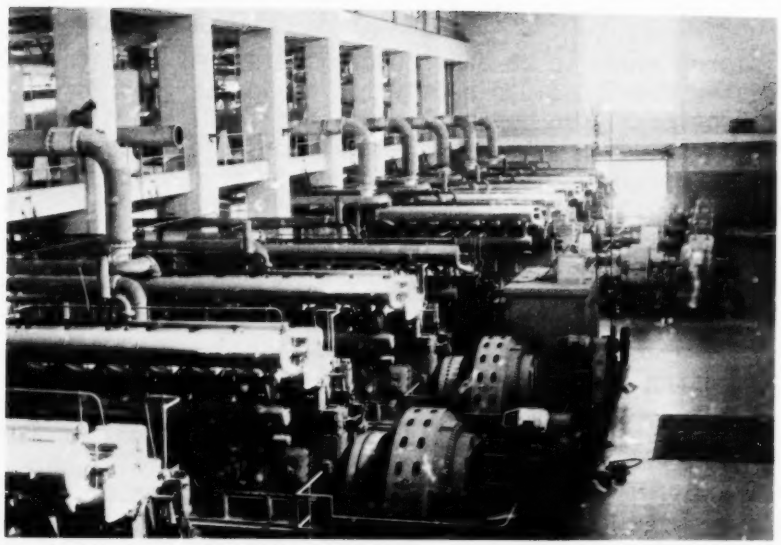
- Partial or complete retirement or cleanup of existing IC engines and replacement with a combined cycle power (CCP) system or off-site sale of digester gas or digester gas products.

- Water injection or selective catalytic reduction (SCR) for NO_x control on the CCP system.

- Removal of H_2S from digester gas prior to combustion to reduce emissions of SO_x. H_2S concentrations less than 5 ppmv appear achievable.

- Use of State-of-the-art particulate control systems that achieve efficient capture of the sub-micron size fraction. An outlet particulate loading of about 0.0005 gr/ACF @ 400°F appears achievable with electrostatically augmented baghouse technology.

- Use of selective non-catalytic reduction (SNCR) or selective catalytic reduction (SCR) or equivalent to control NO_x emissions from thermal processing. SCR appears capable of achieving 90 percent NO_x reduction. SNCR may not provide sufficient NO_x reduction depending on the availability of NO_x offsets from IC engine retirement and may not comply with the definition of Best Available Control Technology (BACT) if such is necessary.



These internal combustion engines have been operated at Hyperion Treatment Plant for more than 25 years. Digester gas is used in the engines to produce electricity and to drive air blowers used in wastewater treatment. A powerplant equipped with turbine generating systems will replace these engines and use the gas from anaerobic digestion of the sludge to produce electricity for use within the Treatment Plant. Replacement of internal combustion engines with a combined cycle turbine generating system enables production of electricity with lower air pollutant emissions. A similar change will occur at the Joint Water Pollution Control Plant operated by Los Angeles County Sanitation Districts.

- Flue gas desulfurization and acid gas control to outlet SO_x concentrations of 20 to 50 ppmv (as SO_2) or less.

Requirements for intermediate storage, standby capacity, management of liquid sidestreams, demonstration facilities, preliminary site layout and ultimate disposal locations are described in the Final EIS/EIR and Draft Facilities Plan. An alternate transportation route of Pershing Drive to Culver Blvd. to Highway 90 to reach the northbound San Diego Freeway will be examined during facility design.

Phase III options have been defined for each of the LA/OMA operating agencies from information available at the time of program development. It is recognized that new information may become available during Phase II which could alter the range of options available during Phase III. The Phase III options, however, provide identification of currently indicated long range alternatives. For the City of Los Angeles, the most reasonable Phase III option appears to be expansion of the Phase II dehydration/thermal processing system.

CAPITAL AND O & M COST FACTORS USED IN ECONOMIC ANALYSIS OF PHASE II FACILITIES

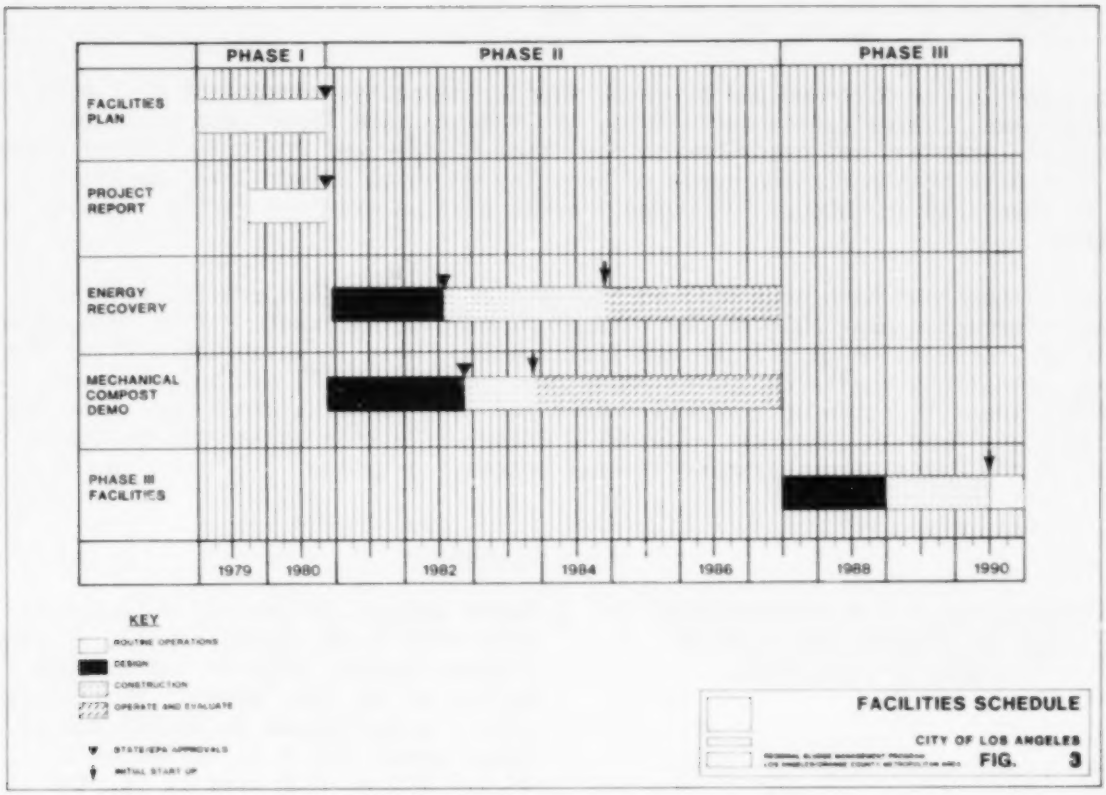
ITEM	RATE
Labor	$14.50/hr
Diesel	$0.65/gal
Electricity	$0.04/KWH
Polymer	$2/lb
Isopar-L	$1.50/gal
Dump Charge	$3/wet ton
ENR (May 1979)	3500
Amortization Factors (for 6-7/8% interest per EPA requirements)	.09349 (20 years) .14156 (10 years) .24307 (5 years)

Economics

Based on cost estimating assumptions presented in the Draft Facilities Plan, a total capital cost of $85,910,000 is estimated for the Phase II facilities, which is equivalent to $8,082,000/yr. Total annual O & M is estimated at $9,417,000/yr with credits for the value of net electricity produced at $5,078,000/yr. The net system cost, defined as annual capital plus O & M less credits, is about $12,421,000/yr. The latter is equivalent to about $84/dry ton of raw sludge processed through the system. Annual capital and operating costs to the CLA, assuming local share of capital costs at 12.5% and O & M costs at 100%, is estimated at $10,427,000/yr. Based on a 1980 service area population of 2.94 million persons, the direct cost per person is estimated to be about $3.55/yr.

Implementation

Phase II facilities for the City of Los Angeles Hyperion Treatment Plant will, as a minimum, be sized to accommodate all sludge from primary treatment of 400 MGD of wastewater plus the waste activated sludge from secondary treatment of 150 MGD of primary effluent.



The foregoing treatment levels have been specified in the City's application for waiver for secondary treatment requirements. Should additional secondary treatment be required, Phase II facilities would need to be expanded to accommodate a larger volume of waste activated sludge. A decision regarding the application for waiver of secondary treatment requirements has not yet been made. Should secondary treatment of all wastewaters be required, Phase II facilities requirements would be identical to the sludge loadings described for Phase III options.

The facilities schedule for the City of Los Angeles is predicated upon State and EPA approval of the facilities plan, environmental documents, and supplemental project report by the end of 1980 and is shown in Figure 3. Some delays have been encountered in initiating the supplemental project report but major changes in the schedule for design and construction are not anticipated at this time.

Facilities planning and design principles identified in the Draft EIS/EIR and Draft Facilities Plan remain essentially unchanged. Key principles are summarized as follows:

System Reliability: A high level of reliability and flexibility will be incorporated in the design by providing standby capacity in key unit processes, a high level of intermediate storage, and conservative design provisions to allow operational flexibility.

Air Emission Controls: Advanced air pollution control systems and retirement or cleanup of existing plant emission sources will be used to comply with prohibitory rules and new source review regulations of the SCAQMD. This will assure a reduction in emission levels from present conditions or, at worst, no increase greater than 150 lb/day (750 lb/day in the case of carbon monoxide).

Nuisance Controls: A conservative design approach will be used to assure that odor, dust, noise, or other nuisance conditions from the Phase II facilities will not result beyond the treatment plant boundary.

Administrative actions relating to preparation of supplemental project reports, permit acquisition, operator recruitment, and contractual arrangements are described in the Final EIS/EIR and Draft Facilities Plan. Additionally, the City of Los Angeles is considering obtaining assistance from private firms and/or knowledgeable individuals for facility start-up and operator training.

Policy actions relating to air quality, industrial source control, and public participation remain essentially as described in the Draft EIS/EIR and Draft Facilities Plan. Questions have recently arisen concerning the applicability of AB 524 (Calvo) in the South Coast Air Basin. However, use of advanced air pollution control equipment should allow full compliance with NSR regulations without use of AB 524 provisions. Additionally, the City of Los Angeles and the Los Angeles County Sanitation Districts will cooperate in the development of data required for filing of applications with the SCAQMD for permits to construct the proposed facilities.

Summary of Impacts and Mitigation Measures

A summary of environmental impacts resulting from the selected project is presented in Table 3. Also shown are the mitigation measures included in the selected project as a result of public review of the Draft EIS/EIR. The impacts shown are those which will result from the selected project including the added mitigation measures. Major mitigation measures added to the project description are in the area of air pollution control systems and design of nuisance control systems.

The proposed Phase II facilities will incorporate air pollution control strategies designed to comply with Regulation IV and Regulation XIII, New Source Review (NSR), of the South Coast Air Quality Management District (SCAQMD). The latter regulation requires that affected stationary sources comply with all appropriate District rules and regulations, and that all emission increases greater than 150 pounds per day, except carbon monoxide for which the limitation is 750 pounds per day, be adequately offset.

One means for compliance with NSR has been projected using the control strategies and advanced air cleanup systems discussed under "Project Description" above. Application of the above control measures can result in emission decreases for all pollutants (i.e. TSP, NO_x, SO_x, CO, and HC) from 1978 Base emissions. At the very worst, no emission increase greater than 150 pounds per day will result, 750 pounds per day in the case of carbon monoxide. In addition, state-of-the-art particulate control technology will be used to assure no adverse impact

TABLE 3

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES
ADOPTED IN SELECTED PHASE II FACILITIES FOR THE
CITY OF LOS ANGELES

ENVIRONMENTAL CONSIDERATIONS	IMPACT	MITIGATION
Geohydrology and Water Quality	No adverse impact on surface and/or groundwater quality.	Total mitigation in plan
Air Quality	No adverse impact on air quality.	Advanced air pollution control systems and cleanup or retirement of existing sources will be used to achieve compliance with new source review.
Archaeological Sites	No adverse impact since a complete field survey determined that none were present.	No mitigation necessary
Visual Character	Construction of new buildings similar to existing structures and exhaust flue gas stacks will be necessary. Some unavoidable adverse impact.	The use of screenings and landscaping to reduce visual impact will be evaluated during design. Some impact is unavoidable.
Nuisances	No adverse impacts from odor, dust, noise or other nuisance conditions.	Facility design will incorporate control systems to assure that nuisance conditions will not result beyond the treatment plant boundary.
Air Pollutants	No adverse impact from combined cycle or thermal processing systems is projected.	Advanced air pollution control systems and cleanup or retirement of existing sources will be used to achieve compliance with new source review. Stack dispersal result in small ground level concentration increments from combined cycle and thermal processing sources.
Heavy Metals	No adverse impact will result from the potential discharge of heavy metals during thermal processing.	State-of-the-art particulate control with efficient capture of the sub-micron size fraction will be used to reduce particulate emissions and associated heavy metals to the lowest achievable levels. The City will continue to implement industrial source control programs to reduce heavy metal concentrations.
Trace Organics	Thermal processing will be designed to destroy trace organics, a beneficial impact.	Total mitigation in plan.
Pathogens	Thermal processing will destroy pathogens contained in sludge. A beneficial impact.	Total mitigation in plan.
Transportation	Minor potential problems in vicinity of disposal sites and entrance to Hyperion. No significant problems on major arterials.	CalTrans and other appropriate agencies will review the traffic pattern during facility design to determine if any corrective measures are required.

TABLE 3 (CONTINUED)

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES
ADOPTED IN SELECTED PHASE II FACILITIES FOR THE
CITY OF LOS ANGELES

ENVIRONMENTAL CONSIDERATIONS	IMPACT	MITIGATION
Waste Disposal	No significant reduction in landfill capacity is projected due to the small quantity of char/ash produced.	No mitigation necessary
Wastewater Treatment	No significant adverse impacts will result from recycle of liquid sidestreams to the Hyperion plant due to the nature and relatively low volume of the sidestreams.	No mitigation necessary
Water Supply	No significant adverse impact on potable water supplies since plant effluent will be used for most water demands.	Total mitigation in plan
Energy	Beneficial impact since net energy will be produced from a renewable organic resource.	No mitigation necessary.
Public Sector	Unavoidable adverse impact since a significant public investment for capital and operating costs is required.	Local capital funding requirements can be reduced if federal/state funding is obtained from one or more available programs.
Private Sector	A beneficial impact will result from stimulation of activity in the private sector of the economy.	No mitigation necessary
Employment	Beneficial impact from increase in employment during the construction phase.	No mitigation necessary
Short Term Use Vs. Long Term Productivity	Alteration of visual character is the only impact which precludes future beneficial uses.	Use of advanced air pollution control strategies to achieve compliance with new source review and use of state-of-the-art particulate control will avoid long-term adverse impacts on air quality and public health from air pollutants and heavy metals from combined cycle and thermal processing sources.
Irreversible Committment of Resources	Public monetary expenditures and use of nonrenewable resources such as fluidizing oil, polymers, diesel fuel, lime, and ammonia.	The investment of nonrenewable resources will achieve net energy production from a renewable resource.
Growth Inducing Impacts	No significant growth inducing impacts will result.	No mitigation necessary

from the possible discharge of heavy metals. Efficient capture of sub-micron size particles will be provided by the particulate control system.

Design of the Phase II facilities will incorporate control measures to assure that nuisance conditions will not result beyond the treatment plant boundaries. Building enclosures, soundproofing, and other acoustical techniques will be used to control noise levels from both stationary and mobile sources. Dusts will be controlled by providing pelleting facilities, ventilation, and air cleanup systems where appropriate. The proposed Phase II facilities will have a low odor potential due to the use of thermal processing which is extremely effective in odor destruction. Other techniques such as coverage, venting, and deodorization of gases from odorous sources will be employed as necessary to assure that odors are not transported outside the treatment plant boundary.

Unavoidable adverse impacts will result only with respect to visual character alteration and use of public sector monies for construction and operation. No other significant adverse impacts have been identified. Beneficial impacts will result from the destruction of trace organics and pathogens, production of energy from a renewable resource, stimulation of the private sector economy and resulting increase in employment during the construction phase.

Alteration of visual character is the only impact which will preclude future beneficial uses.

Expenditure of public monies and use of nonrenewable resources represent an irreversible commitment of resources. Nonrenewable resources used will include fluidizing oil in the dehydration system, organic polymers for mechanical dewatering, diesel fuel for mobile equipment, lime (or other caustic) for flue gas desulfurization, and ammonia for NO_x reduction. However, investment of the nonrenewable resources will achieve energy recovery from the renewable organics in sludge. Energy recovered from the renewable sludge resource will be greater than that associated with consumption of the nonrenewable resources.

There will be no significant growth inducing impacts as a result of the project.

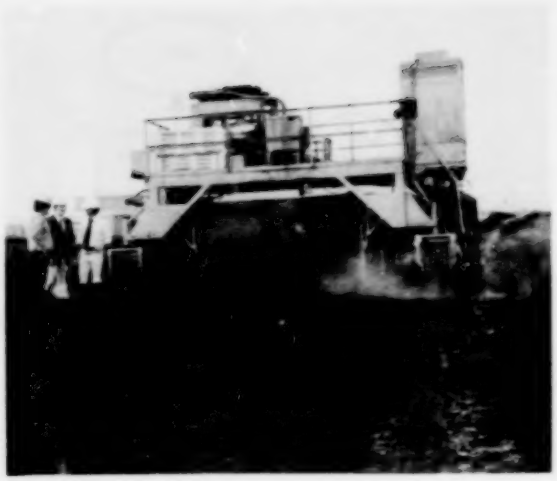
LOS ANGELES COUNTY SANITATION DISTRICTS

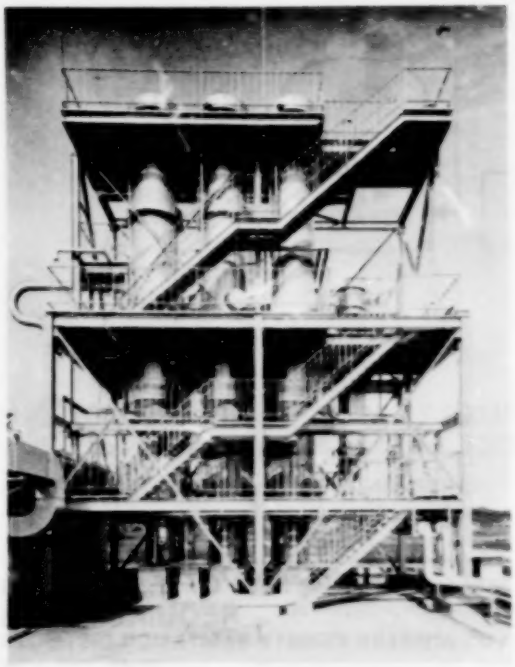
A combination of thermal processing, composting, and landfill disposal has been found to be the most feasible alternative for the Los Angeles County Sanitation Districts. The project is compatible with applicable regulatory requirements, can be implemented within the existing treatment plant boundaries, and provides for resource recovery through production of electricity and steam for use in the processing of wastewaters and sludges and through production of compost material. The project description remains essentially unchanged from that in the Draft EIS/EIR and Draft Facilities Plan. It is noted however that vairous thermal processing systems will be evaluated during design. Certain air pollution control mitigation measures have been added.

Project Description

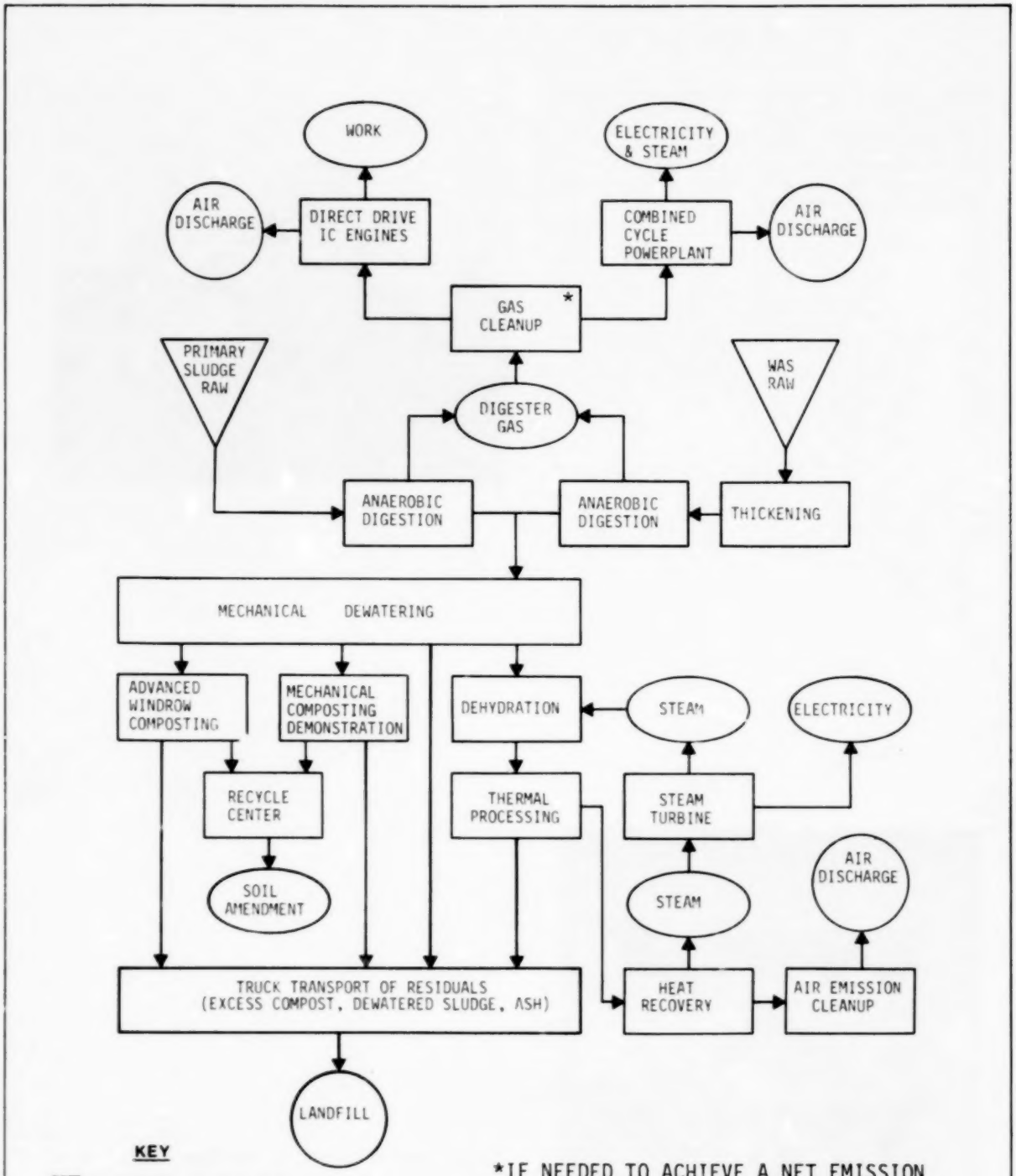
A conceptual diagram of the selected facilities is presented in Figure 4. All waste activated sludge (WAS) will be thickened and anaerobically digested,

Windrow composting and recycling of composted sludge has been practiced since 1972 by the Los Angeles County Sanitation Districts at the Joint Water Pollution Control Plant. Under the proposed plan, dusts and odors from conventional windrow composting will be reduced as a result of modifications that will be made to improve operating performance and wet weather capability. Note steam rising from the windrow indicating elevated temperatures in the windrow.





The Carver-Greenfield process, first investigated by the City of Los Angeles in 1975, is an innovative energy efficient system for producing dry sludge that can be combusted without addition of supplemental fuels such as fuel oil. Nearly 70 Carver-Greenfield installations are operating in the rendering, food processing, and dairy industries. Units have been installed in Japan at Hiroshima and Fukuchiyama City (shown at left) to process sludge generated by municipal wastewater treatment plants. A facility at Coors Brewery in Golden, Colorado processes waste activated sludge at the brewery waste treatment facility. The process is a key element in the thermal processing for energy recovery systems that will be used at the City of Los Angeles Hyperion Treatment Plant and the Joint Water Pollution Control Plant of the Los Angeles County Sanitation Districts. (Photo courtesy of Foster-Wheeler Energy Corporation)


WORK
ELECTRICITY & STEAM
AIR DISCHARGE
DIRECT DRIVE IC ENGINES
COMBINED CYCLE POWERPLANT
AIR DISCHARGE
GAS CLEANUP *
PRIMARY SLUDGE RAW
WAS RAW
DIGESTER GAS
ANAEROBIC DIGESTION
ANAEROBIC DIGESTION
THICKENING
MECHANICAL DEWATERING
ADVANCED WINDROW COMPOSTING
MECHANICAL COMPOSTING DEMONSTRATION
DEHYDRATION
STEAM
ELECTRICITY
RECYCLE CENTER
THERMAL PROCESSING
STEAM TURBINE
SOIL AMENDMENT
STEAM
AIR DISCHARGE
TRUCK TRANSPORT OF RESIDUALS (EXCESS COMPOST, DEWATERED SLUDGE, ASH)
HEAT RECOVERY
AIR EMISSION CLEANUP
LANDFILL
KEY
INPUTS TO THE SYSTEM
UNIT PROCESSES
USEFUL PRODUCTS
END POINTS OF THE SYSTEM
IC - INTERNAL COMBUSTION
WAS - WASTE ACTIVATED SLUDGE
*IF NEEDED TO ACHIEVE A NET EMISSION INCREASE OF 150 LBS/DAY SOX OR LESS.
NOTE: PASTEURIZATION DEMO NOT SHOWN
OVERVIEW OF FACILITIES REQUIREMENTS
LOS ANGELES COUNTY SANITATION DISTRICTS
REGIONAL SLUDGE MANAGEMENT PROGRAM
LOS ANGELES/ORANGE COUNTY METROPOLITAN AREA
FIG. 4

either separately or in combination with primary sludge (PS). Existing mechanical dewatering facilities at JWPCP will be expanded and modified as necessary to process sludge loadings expected during Phase II. The facility will be designed to process either combined sludges or separated streams. Separate conveyance and wet cake storage facilities will be provided as necessary to process in the separated mode.

Following mechanical dewatering a portion of the sludge (about 75-150 dtpd average) will be truck hauled and disposed at the Puente Hills Sanitary Landfill, which is currently being equipped with a leachate control system. A second portion of the sludge (about 100-150 dtpd) will be composted using an advanced windrow composting system. Compost product will be reused via an on-site recycle center or landfill disposed if not marketable. The term advanced windrow composting embodies several improvements over windrow composting as presently practiced at JWPCP. Elements considered important in design of the advanced compost system were discussed in the Final EIS/EIR and Draft Facilities Plan.

A recycle center is currently operated on the JWPCP facility by a private company. Existing physical facilities will continue in operation under contractual arrangements that are negotiated from time to time by LACSD. Modifications to this facility may be necessary, taking into consideration the visual attractiveness to the local community and potential nuisance conditions. Possibilities include enclosed buildings for all dusty or odorous material and operations; increased set-back of structures from the street and construction of appropriate screening to reduce the visual impact of the facility.

Remaining sludge (about 250 dtpd) will be dehydrated using the Carver-Greenfield drying process. Dried product from the dehydration process will be thermally processed for energy recovery. Energy from combustion will be extracted in a waste heat boiler. Steam will be used for electrical power generation in a steam turbine and for process applications in the dehydration system. Char and ash produced during thermal processing will be truck hauled to Puente Hills Landfill or identified alternative sites for disposal.

Digester gas will be combusted in a combined cycle power (CCP) generation facility for energy recovery. A portion of digester gas may continue to be used in existing internal combustion (IC) engines.

An advanced air cleanup train will be used to reduce emissions of atmospheric pollutants and to comply with Regulation IV and Regulation XIII, New Source Review (NSR), of the South Coast Air Quality Management District (SCAQMD). One means for compliance with NSR without resort to external offsets is projected using the following air pollution control strategies. It should, however, be noted that LACSD is preparing alternative strategies for compliance with NSR and the exact nature of the control system will be established as part of the permitting system.

- Partial or complete retirement or cleanup of existing IC engines and replacement with a combined cycle power (CCP) system.

- Water injection or selective catalytic reduction (SCR) for NO_x control on the CCP system.

- Removal of H_2S from digester gas prior to combustion to reduce SO_x emissions. H_2S concentrations less than 5 ppmv appear achievable.

- Use of state-of-the-art particulate control systems that achieve efficient capture of the sub-micron size fraction. An outlet particulate loading of about 0.0005 gr/ACF @ 400°F appears achievable with electrostatically augmented baghouse technology.

- Use of selective non-catalytic reduction (SNCR) or selective catalytic reduction (SCR) or equivalent to control NO_x emissions from thermal processing. SCR appears capable of achieving 90 percent NO_x reduction. SNCR may not provide sufficient NO_x reduction depending on the availability of NO_x offsets from IC engine retirement and may not comply with the definition of Best Available Control Technology (BACT) if such is necessary.

- Flue gas desulfurization and acid gas control to outlet SO_x concentrations of 20 ppmv as SO_2 or less.

Requirements for intermediate storage, standby capacity and management of liquid sidestreams remain as described in the Draft EIS/EIR and Draft Facilities Plan. Preliminary site layout, ultimate disposal location and transportation routes are described in the Final EIS/EIR. Demonstration facilities remain as described in the Draft EIS/EIR and Draft Facilities Plan except that a decision regarding pelleting and heat drying of mechanical composting outfeed will be deferred for consideration during design of the facilities.

Phase III options have been defined for each of the LA/OMA operating agencies from information available at the time of program development. It is recognized that new information may become available during Phase II which could alter the range of options available during Phase III. The Phase III options, however, provide identification of currently indicated long range alternatives. For the Los Angeles County Sanitation Districts, reasonable Phase III options appear to be continuation of Phase II facilities; complete reliance on energy recovery via dehydration/thermal processing; and complete reliance on mechanical composting. Landfilling of dewatered sludge is not a viable long range alternative.

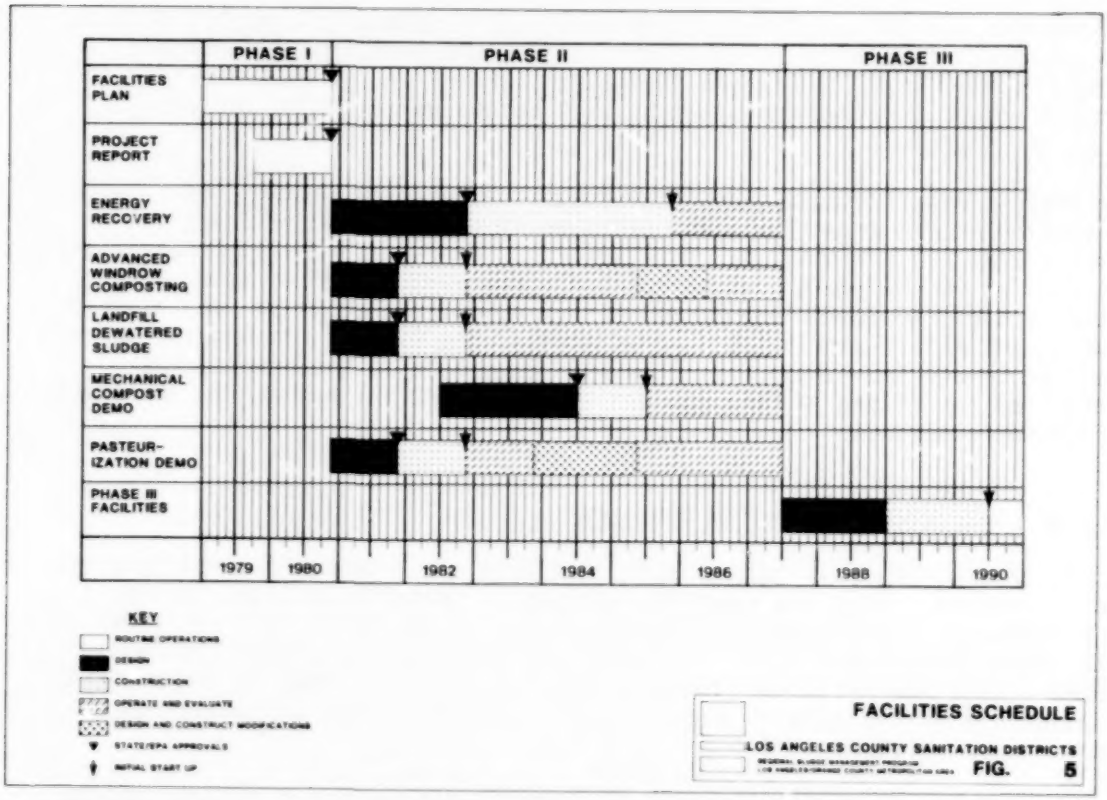
Economics

Based on cost estimating assumptions presented in the Draft Facilities Plan, a total capital cost of $123,087,000 is estimated for the Phase II facilities, which is equivalent to $11,814,000/yr. Total annual O & M is estimated at $14,655,000/yr with credits for the value of fuel, electricity, and compost produced at $7,621,000/yr. The net system cost, defined as annual capital plus O & M less credits, is about $18,848,000/yr. The latter is equivalent to about $72/dry ton of raw sludge processed through the system. Annual capital and operating costs to LACSD, assuming local share of capital costs at 12.5% and O & M costs at 100%, is estimated at $16,132,000/yr. Based on a 1980 service area population of 3.72 million persons, the cost per person is estimated to be about $4.34/yr. (Capital and O & M cost factors are listed on page 15.)

Implementation

Phase II facilities for Los Angeles County Sanitation Districts' Joint Water Pollution Control Plant will, as a minimum, be sized to accommodate all sludge from primary treatment of 330 MGD of wastewater plus the waste activated sludge from secondary treatment of 200 MGD of primary effluent. The foregoing treatment levels have been specified in the Districts' application for waiver of secondary treatment requirements. Should additional secondary treatment be required, Phase II facilities would need to be expanded to accommodate a larger volume of waste activated sludge. A decision regarding the application for waiver of secondary treatment requirements has not yet been made. Should secondary treatment of all wastewaters be required, Phase II facilities requirements would be identical to the sludge loadings described for Phase III options.

The facilities schedule for the Los Angeles County Sanitation Districts is predicated upon State and EPA approval of the facilities Plan, environmental documents, and supplemental project report by the end of 1980 and is shown in Figure 5. No major changes in the schedule for design and construction are anticipated at this time.



Facilities planning and design principles identified in the Draft EIS/EIR and Draft Facilities Plan remain essentially unchanged. Key principles are summarized as follows:

System Reliability: A high level of reliability and flexibility will be incorporated in the design by providing standby capacity in key unit processes, a high level of intermediate storage, and conservative design provisions to allow operational flexibility.

Air Emission Controls: Advanced air pollution control systems and retirement or cleanup of existing plant emission sources will be used to comply with prohibitory rules and new source review regulations of the SCAQMD. This will assure a reduction in emission levels from present conditions or, at worst, no increase greater than 150 lb/day (750 lb/day in the case of carbon monoxide).

Nuisance Controls: A conservative design approach will be used to assure that odor, dust, noise, or other nuisance conditions from the Phase II facilities will not result beyond the treatment plant boundary.

Administrative actions relating to preparation of supplemental project reports, permit acquisition, operator recruitment, and contractual arrangements are described in the Final EIS/EIR and Draft Facilities Plan. The possibility of using contractual services for start-up will be evaluated during the design phase of the program.

Policy actions relating to air quality, industrial source control, and public participation remain essentially as described in the Draft EIS/EIR and Draft Facilities Plan. Questions have recently arisen concerning the applicability of AB 524 (Calvo) in the South Coast Air Basin. However, use of advanced air pollution control equipment should allow full compliance with NSR regulation without use of AB 524 provisions. Additionally, the City of Los Angeles and the Los Angeles County Sanitation Districts will cooperate in the development of data required for filing of applications to the SCAQMD for permits to construct the proposed facilities.

Summary of Impacts and Mitigation Measures

A summary of environmental impacts resulting from the proposed project is presented in Table 4. Also shown are the mitigation measures included in the project description as a result of public review of the Draft EIS/EIR. The impacts shown are those which will result from the proposed project including the added mitigation measures. Major mitigation measures added to the project description are in the area of air pollution control systems and design of nuisance control systems.

The proposed Phase II facilities will incorporate air pollution control strategies designed to comply with Regulation XIII, New Source Review (NSR), of the South Coast Air Quality Management District (SCAQMD). This regulation requires that affected stationary sources comply with all appropriate District rules and

regulations, and that all emission increases greater than 150 pounds per day except carbon monoxide for which the limitation is 750 pounds per day, be adequately offset.

One means for compliance with NSR has been projected using the control strategies and advanced air cleanup systems discussed under "Project Description" above. Application of the above control measures can result in emission reductions for particulates, NO_x, and HC from 1978 Base emission. At the very worst, no emission increase greater than 150 pounds per day will result, 750 pounds per day in the case of carbon monoxide. In addition, state-of-the-art particulate control technology will be used to assure no adverse impact from the possible discharge of heavy metals. Efficient capture of sub-micron size particles will be provided by the particulate control system.

Design of the Phase II facilities will incorporate control measures to assure that nuisance conditions outside the treatment plant boundary are not increased but instead reduced. Building enclosures, soundproofing, and other acoustical techniques will be used to control noise levels from both stationary and mobile sources. Dust will be controlled by providing pelleting facilities, ventilation, and air cleanup systems where appropriate. Both odors and dust from composting should be reduced from present levels using the control measures discussed as part of advanced windrow composting in the Final EIS/EIR and Draft Facilities Plan.

Unavoidable adverse impacts will result only in the areas of visual character alteration and use of public sector monies for construction and operation. No other significant adverse impacts have been identified. Beneficial impacts will result from the destruction of trace organics and pathogens, production of energy from a renewable resource, resource recovery from use of compost material, stimulation of the private sector economy and resulting increase in employment during the construction phase.

Alteration of visual character is the only impact which will preclude future beneficial uses. Nuisance conditions have the potential to preclude beneficial uses but the Phase II facilities should result in improvements from present conditions.

Expenditure of public monies and use of nonrenewable resources represent an irreversible committment of resources. Nonrenewable resources used will include fluidizing oil in the dehydration system, organic polymers for mechanicl dewatering, diesel fuel for mobile equipment, lime (or other caustic) for flue gas desulfurization, and ammonia for NO_x reduction. However, investment of the nonrenewable resources will achieve energy recovery from the renewable organics in sludge and resource recovery in the form of compost product. Energy recovered from the renewable sludge resource will be greater than that associated with consumption of the nonrenewable resources.

There will be no significant growth inducing impacts as a result of the project.

TABLE 4

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES
ADOPTED IN SELECTED PHASE II FACILITIES FOR
LOS ANGELES COUNTY SANITATION DISTRICTS

ENVIRONMENTAL CONSIDERATIONS	IMPACT	MITIGATION
Geohydrology and Water Quality	No adverse impact on surface and/or groundwater quality will result at JWPCP. A leachate control system will prevent adverse impacts at the Puente Hills Landfill.	Total mitigation in plan
Air Quality	No significant adverse impact on air quality	Advanced air pollution control systems and cleanup or retirement of existing sources will be used to achieve compliance with new source review.
Terrestrial Biota	No adverse impacts. Sensitive biotic species in an area adjacent to potential expansion will be protected.	Total mitigation in plan
Archaeological Sites	No adverse impacts. Suspected archaeological resources will be protected through a cultural resources mitigation program.	Total mitigation in plan
Visual Character	Construction of new buildings similar to existing structures and exhaust flue gas stacks will be necessary. Some unavoidable adverse impact.	The use of screenings and landscaping to reduce visual impact will be evaluated during design. Some impact is unavidable.
Nuisances	The windrow composting operation can potentially produce odors and dusts.	The advanced windrow composting concept should reduce odor and dust nuisances from present levels. Additional mitigation measures are available if nuisance reduction is not sufficient to meet community standards. Facility design will incorporate control systems to assure that nuisance conditions from other sludge processing will not result beyond the treatment plant boundary.
Air Pollutants	No adverse impact from combined cycle or thermal processing systems is projected.	Advanced air pollution control systems and cleanup or retirement of existing sources will be used to achieve compliance with new source review. Stack dispersal wil result in small ground level concentration increments from combined cycle and thermal processing sources.
Heavy Metals	No adverse impact will result from thermal processing or landfill disposal. No significant adverse effect will result from compost use on non-food chain crops.	State-of-the-are particulate control with efficient capture of the sub-micron size fraction will be used to reduce particulate emissions and associated heavy metals to the lowest achievable levels. LACSD will continue to implement industrial source control programs to reduce heavy metal concentrations.

TABLE 4 (CONTINUED)

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES
ADOPTED IN SELECTED PHASE II FACILITIES FOR
LOS ANGELES COUNTY SANITATION DISTRICTS

ENVIRONMENTAL CONSIDERATIONS	IMPACT	MITIGATION
Trace Organics	Thermal processing will be designed to destroy trace organics, a beneficial impact. No significant adverse impacts will result from compost use or landfilling.	Further mitigation is not required
Pathogens	No significant adverse public health impacts will result from landfilling, composting or thermal processing.	Further mitigation is not required at this time. Heat pasteurization (an LACSD demonstration project) or other suitable techniques could be used to achieve further pathogen control if deemed necessary in the future.
Transportation	Trucking of residuals to landfill should not aggrevate congestion on major arterials. Minor problem identified near Calabasas landfill if latter is used.	If Calabasas landfill is used, CalTrans and other appropriate agencies will review the traffic pattern during facility design to determine if any corrective measures are required.
Waste Disposal	No significant reduction in landfill capacity is projected due to the small quantity of char/ash produced.	No mitigation necessary
Wastewater Treatment	No significant adverse impacts will result from recycle of liquid sidestreams to the JWPCP plant due to the nature and relatively low volume of the sidestreams.	No mitigation necessary
Water Supply	No significant adverse impact on potable water supplies since plant effluent will be used for most water demands.	Total mitigation in plan
Energy	Beneficial impact since net energy will be produced from a renewable organic resource.	No mitigation necessary
Public Sector	Unavoidable adverse impact since a significant public investment for capital and operating costs is required.	Local capital funding requirements can be reduced if federal/state funding is obtained from one or more available programs.
Private Sector	A beneficial impact will result from stimulation of activity in the private sector of the economy.	No mitigation necessary
Employment	Beneficial impact from increase in employment during the construction phase.	No mitigatioon necessary

TABLE 4 (CONTINUED)

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES
ADOPTED IN SELECTED PHASE II FACILITIES FOR
LOS ANGELES COUNTY SANITATION DISTRICTS

ENVIRONMENTAL CONSIDERATIONS	IMPACT	MITIGATION
Short-Term Use Vs. Long-Term Productivity	Alteration of visual character and potential minor nuisances are the only impacts which could preclude future beneficial use.	Use of advanced air pollution control strategies to achieve compliance with new source review and use of state-of-the-art particulatecontrol will avoid long-term adverse impacts on air quality and public health from air pollutants and heavy metals from combined cycle and thermal processing sources. Advanced windrow composting should significantly reduce the nuisance potential.
Irreversible Committment of Resources	Public monetary expenditures and use of nonrenewable resources such as fluidizing oil, polymers, diesel fuel, lime, and ammonia.	The investment of nonrenewable resources will achieve net energy production from a renewable resource.
Growth Inducing Impacts	No significant growth inducing impacts will result.	No mitigation necessary

ORANGE COUNTY SANITATION DISTRICTS

A land based non-thermal processing system has been selected to serve the Orange County Sanitation Districts (OCSD) and other sanitation agencies within Orange County. Orange County Sanitation Districts will monitor performance of thermal processing and energy recovery systems to be constructed and operated by the City of Los Angeles and Los Angeles County Sanitation Districts with a view towards installation of a thermal processing system at some point in the future.

Project Description

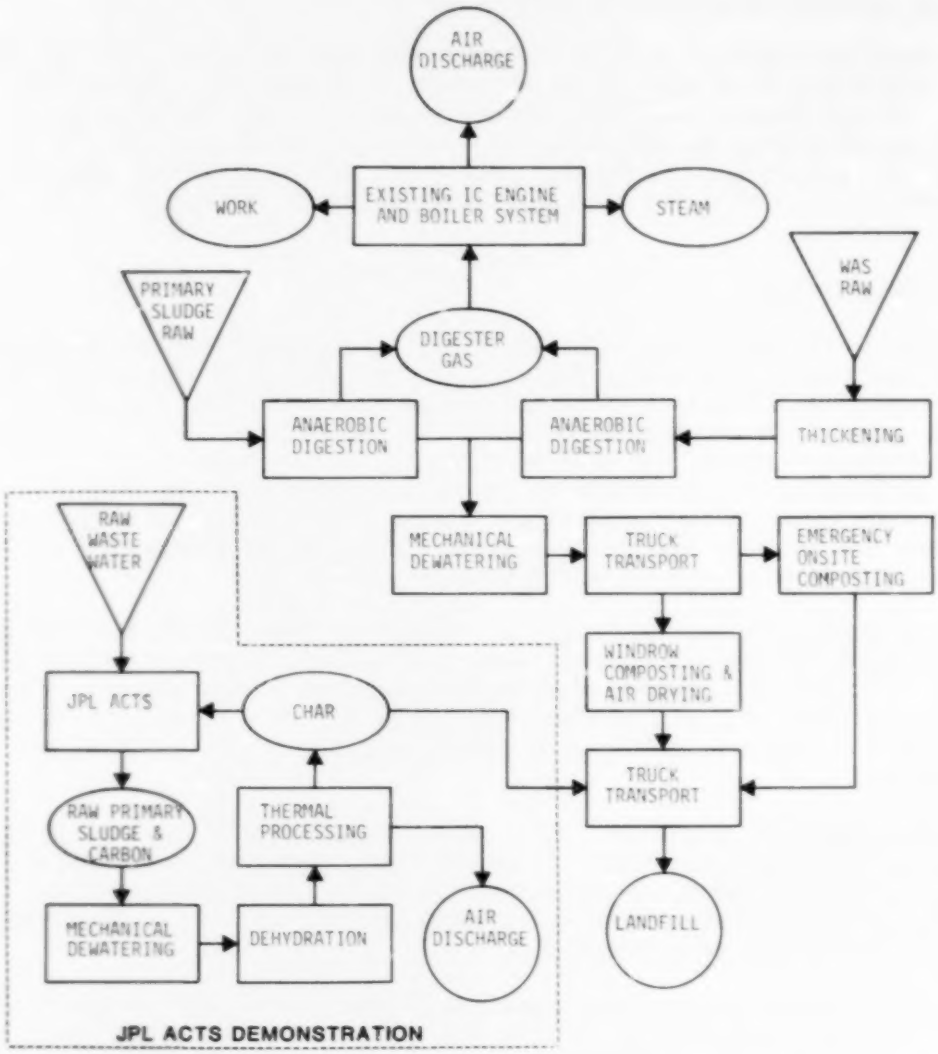
A conceptual diagram of the selected facilities is presented in Figure 6. All sludges would be anaerobically digested at the Joint Works for gas recovery and volume reduction. Dewatered digested sludge would be truck transported to an offsite location for further processing. At the offsite location, a combination of composting and air drying will be employed to reduce water content of the sludge to 50 percent. A portion of the dried sludge would be stockpiled to be blended with incoming dewatered sludge during winter months to enable successful operation of a windrow composting system. Excess dried sludge will be truck hauled to Bee Canyon Landfill for disposal.

Air dried sludge will not be recycled. Properly composted sludge will not be made available for recycling until such time as metals content of the OCSD sludges is either (1) consistent with the projected sludge characteristics contained in Chapter I of the Final EIS/EIR or (2) sufficiently low to enable recycling of sludges in conformance with applicable federal, state, and local regulations.

Other than anaerobic digestion, all sludge processing will eventually be accomplished at the Huntington Beach Treatment Plant. However, provision will be made for a 10-acre emergency composting system at the Fountain Valley Treatment Plant to serve as a backup during inclement weather and in the event that truck transport operations are disrupted.

The proposed sludge management program described in the Draft EIS/EIR and Draft Facilities Plan identified an offsite processing location in the lower Round Canyon area of the Lomas de Santiago foothills. As a result of public comment on the Draft EIS/EIR, other potentially suitable locations have been identified in the upper Round Canyon area adjacent to the Bee Canyon Landfill and in the Whiting's Corner portion of the Irvine Ranch. Locations of these alternative sites is presented in Figure 7. A supplemental environmental impact statement/report will be prepared by OCSD to provide the basis for selection of the site for the composting/air drying operation. The Supplemental EIS/EIR will consider alternative locations in (1) the upper Round Canyon Area, (2) the Whiting's Corner area of the Irvine Ranch, and (3) the lower Round Canyon site and its immediate vicinity. The Supplemental EIS/EIR will address all site related issues and may result in modification of transportation routes. Other features of the selected project description remain essentially as described in the Draft EIS/EIR and Draft Facilities Plan.

Phase III options provide identification fo currently indicated long-range alternatives. These have been defined from information available at the time of program development. It is recognized that new information may become available

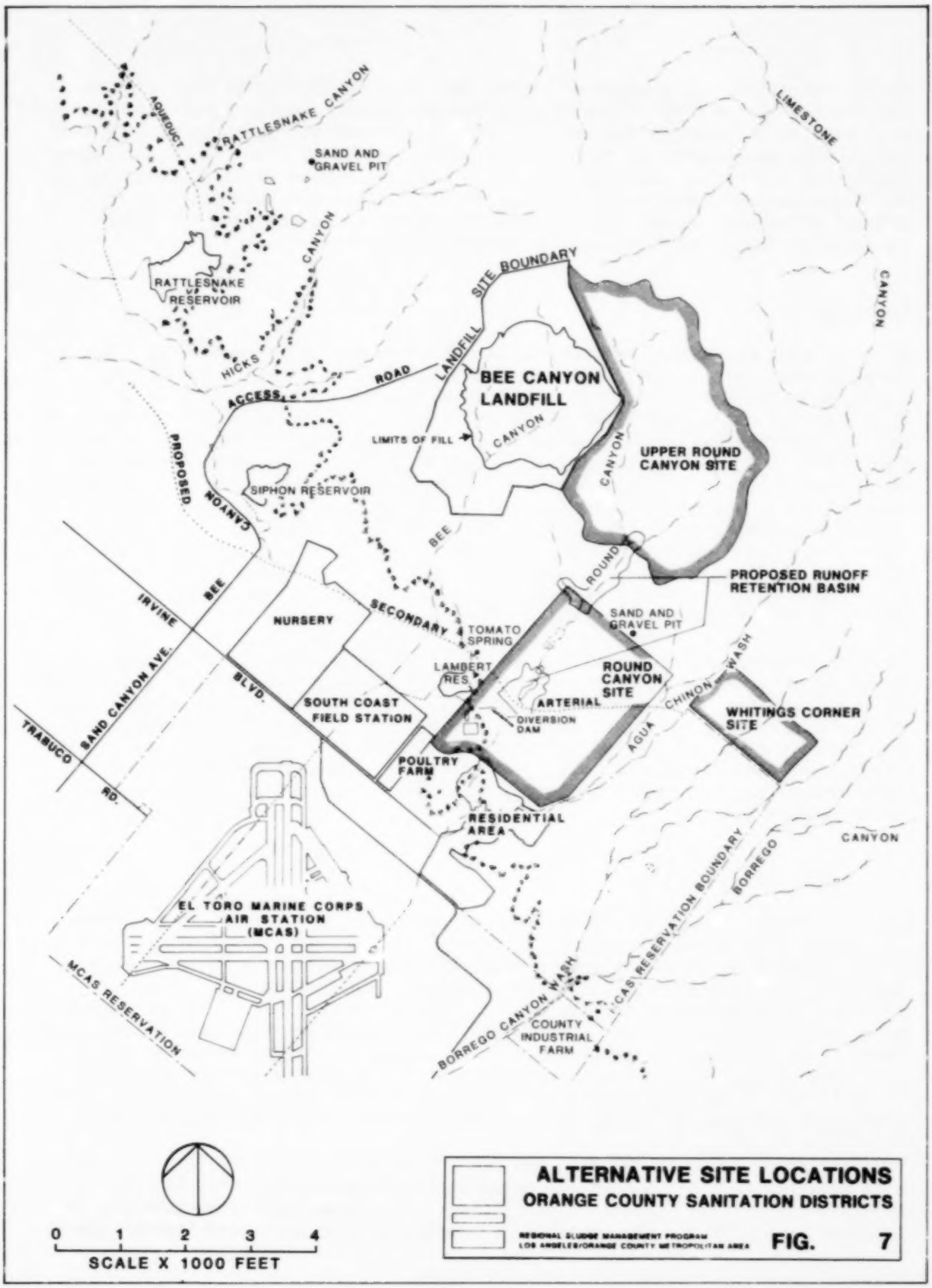


KEY

- INPUTS TO THE SYSTEM
- UNIT PROCESSES
- USEFUL PRODUCTS
- END POINTS OF THE SYSTEM

IC - INTERNAL COMBUSTION
WAS - WASTE ACTIVATED SLUDGE
JPL ACTS - ACTIVATED CARBON TREATMENT SYSTEM

OVERVIEW OF FACILITIES REQUIREMENTS
ORANGE COUNTY SANITATION DISTRICTS
REGIONAL SLUDGE MANAGEMENT PROGRAM
LOS ANGELES/ORANGE COUNTY METROPOLITAN AREA
FIG. 6


AQUEDUCT
RATTLESNAKE CANYON
SAND AND GRAVEL PIT
LIMESTONE
CANYON
RATTLESNAKE RESERVOIR
HICKS CANYON
SITE BOUNDARY
LANDFILL
ACCESS ROAD
BEE CANYON LANDFILL
LIMITS OF FILL
CANYON
UPPER ROUND CANYON SITE
PROPOSED CANYON
SIPHON RESERVOIR
BEE
ROUND
PROPOSED RUNOFF RETENTION BASIN
IRVINE BLVD.
NURSERY
SECONDARY
TOMATO SPRING
SAND AND GRAVEL PIT
LAMBERT RES
ROUND CANYON SITE
ARTERIAL
DIVERSION DAM
AGUA CHINON WASH
WHITINGS CORNER SITE
SAND CANYON AVE.
TRABUCO RD.
SOUTH COAST FIELD STATION
POULTRY FARM
RESIDENTIAL AREA
EL TORO MARINE CORPS AIR STATION (MCAS)
MCAS RESERVATION
MCAS RESERVATION BOUNDARY
BORREGO
BORREGO CANYON WASH
COUNTY INDUSTRIAL FARM
0 1 2 3 4
SCALE X 1000 FEET
ALTERNATIVE SITE LOCATIONS
ORANGE COUNTY SANITATION DISTRICTS
REGIONAL SLUDGE MANAGEMENT PROGRAM
LOS ANGELES/ORANGE COUNTY METROPOLITAN AREA
FIG. 7

during Phase III. On a regional basis, the Phase II facilities that will be constructed by the City of Los Angeles and Los Angeles County Sanitation Districts will provide information for use by OCSD. Additionally, there may be potential for further development of the JPL-ACTS process by OCSD. For the Orange County Sanitation Districts, reasonable Phase III options appear to be continuation of the Round Canyon composting/air drying facilities, or complete reliance on a thermal processing system such as dehydration/thermal processing for energy recovery or the JPL-ACTS wastewater treatment process.

Economics

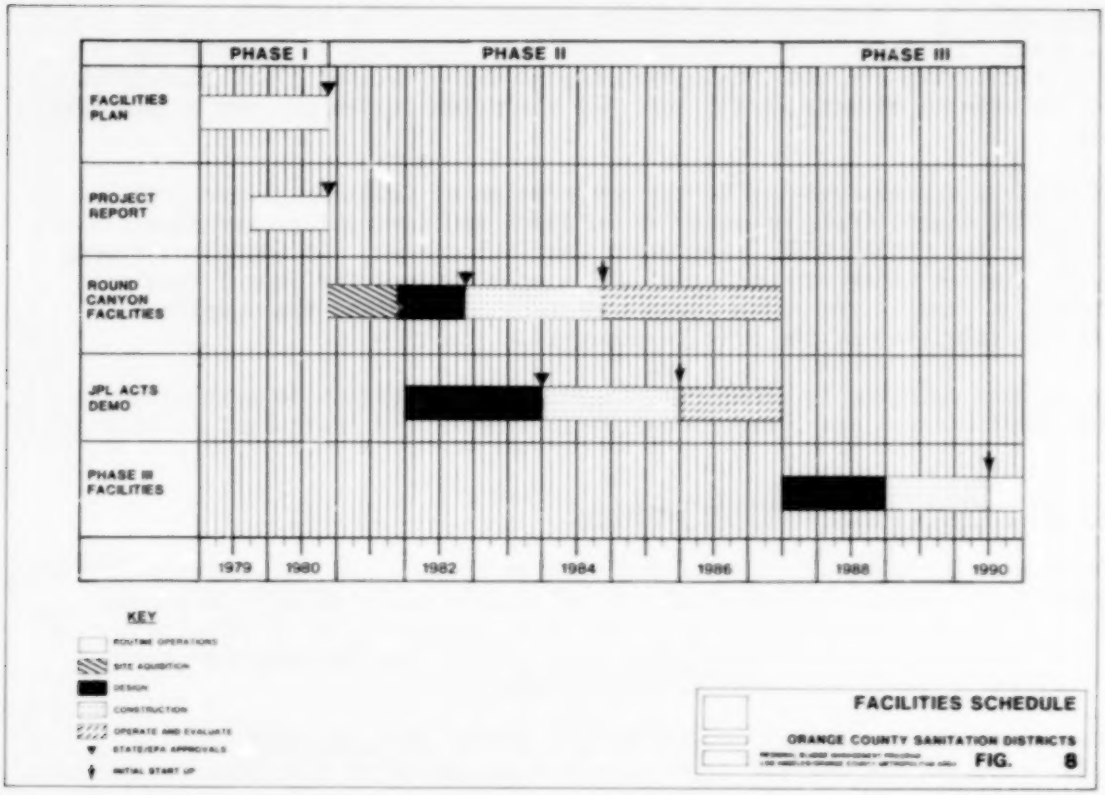
Based on cost estimating assumptions presented in the Draft Facilities Plan, a total capital cost of $39,600,000 is estimated for the Phase II facilities, which is equivalent to $4,128,000/yr. Total annual O & M is estimated at $8,332,000/yr with credits for the value of fuel produced at $2,709,000/yr. The net cost, defined as annual capital plus O & M less credits, is about $9,751,000/yr. The latter is equivalent to about $75/dry ton of raw sludge processed through the system (based on OCSD sludge contribution only). Annual capital and operating costs to OCSD, assuming local share of capital costs at 12.5% and O & M costs at 100%, is estimated at $8,848,000/yr. Based on an OCSD 1980 service area population of 1.60 million persons, the cost per person is estimated to be about $5.53/yr. This would reduce to about $5.01/yr if other Orange County Agencies contribute their share of processing costs at the off-site facility. (Capital and O & M cost factors are listed on page 15.)

If only OCSD sludges are processed at the off-site facility, capital costs at Round Canyon would be reduced to about $18,400,000, equivalent to an annual cost of $1,814,000/yr. O & M would be about $922,000/yr giving a total annual cost of $2,736,000/yr, compared to about $3,280,000/yr if other Orange County sludges are also processed. If costs for trucking and landfill disposal of the compost product are considered, the total cost increment for handling the 80 dtpd of other Orange County sludges is estimated at about $827,000/yr, equivalent to about $28/dry ton.

Implementation

Phase II sludge management facilities will as a minimum be sized to accommodate all sludge from primary treatment of 280 MGD of wastewater and the waste activated sludge from secondary treatment of 150 MGD of primary effluent. These treatment levels are specified in the Districts' application for waiver of secondary treatment requirements submitted under Section 301(h) of the Federal Water Pollution Control Act. Should additional secondary treatment be required, Phase II facilities will be expanded to accommodate a larger volume of waste activated sludge. Should secondary treatment of all wastewaters be required, Phase II facilities requirements will be identical to the sludge loadings described and analyzed for Phase III options and reported in the Draft EIS/EIR.

The facilities schedule shown in the Draft EIS/EIR and Draft Facilities Plan has been modified to provide time for preparation of the Supplemental EIS/EIR for selection of offsite processing facilities. A revised facilities schedule is provided in Figure 8. The schedule is predicated upon State and Federal approv-



al of the final EIS/EIR by the end of 1980 and initiation of preparation of the Supplemental EIS/EIR in the last quarter of calendar year 1980. After completion of the Supplemental EIS/EIR, site acquisition and design could proceed concurrently provided that access for detailed topographic surveys, and engineering and geologic work could be obtained. Other features of the facilities schedule would be the same as described in the Draft EIS/EIR and Draft Facilities Plan.

Facilities planning and design principles identified in the Draft EIS/EIR and Draft Facilities Plan remain essentially unchanged. Key principles are summarized as follows:

System Reliability: A high level of reliability and flexibility will be incorporated in the design by providing standby capacity for key unit processes, a high level of intermediate storage, and conservative design principles to allow operational flexibility.

Air Pollution Controls: Advanced air pollution control systems will be applied to the JPL-ACTS demonstration facility and to other thermal processing systems which may be installed for sludge processing in the future. All emission sources will comply with the rules and regulations of the South Coast Air Quality Management District (SCAQMD).

Nuisance Controls: A conservative design approach will be used to assure that odors, dust, noise, or other nuisance conditions resulting from operation of Phase II facilities are not transported beyond the treatment plant boundaries or, in the case of offsite facilities, are minimized to the maximum extent practicable.

Administrative actions related to the preparation of supplemental project reports, permit acquisition, operator recruitment and contractual arrangements are described in the Final EIS/EIR and Draft Facilities Plan. In addition, Orange County Sanitation Districts will include in applications for Step I funding assistance, a request for those funds necessary to complete the Supplemental EIS/EIR for selection of the offsite processing location.

Policy actions relating to industrial source control and public participation will be undertaken as described in the Final EIS/EIR and Draft Facilities Plan.

Summary of Impacts and Mitigation Measures

A summary of environmental impacts projected to result from the selected project is presented in Table 5. Also shown are mitigation measures that have been included in the selected project as a result of public review of the Draft EIS/EIR. The impacts shown are those which will result from the selected project after incorporation of the added mitigation measures.

As a result of public comment on the Draft EIS/EIR additional potentially suitable locations for the air drying/composting operation have been identified. A supplemental EIS/EIR will be prepared to provide the basis for selection of the site for the sludge processing facilities. As indicated in Table 5 many of the environmental considerations will be addressed in the Supplemental EIS/EIR and impacts and mitigation measures associated with the selected site will be defined.

Digester gas produced by Phase II sludge processing facilities will be combusted at the treatment plants in existing internal combustion engines. Since these engines are not included in facilities in the selected project, impacts associated with their use are not a direct result of the selected project.

RESEARCH AND CONTINUING PLANNING

Research studies were identified during the course of development of the selected sludge management program to improve the state of knowledge and provide flexibility for decision making at the end of Phase II. Studies have been identified with regard to (1) potential for using the sanitary landfill as an energy source, (2) detailed monitoring of Phase II facilities, (3) further examination of environmental consequences of low levels of toxicant emissions, (4) opportunities for segregation of sludges in the sewerage system, (5) efficiency of industrial source control programs, and (6) regional examination of liquid waste disposal needs.

Public review and comment resulted in the identification of needed research on sludge disposal in deep ocean basins. A demonstration study involving detailed

pre-discharge and post-discharge evaluations was suggested. This need together with those identified above consitute the complete list of research needs identified by the Final EIS/EIR.

Provisions for compliance with requirements Section 208 and responsibility for continuing program update were described in the Final EIS/EIR and Draft Facilities Plan and have not changed. Such provisions will be used to achieve Section 208 compliance and to establish responsibility for continuing program update.

Orange County Sanitation Districts currently air dry dewatered sludge at the Coyote Canyon landfill. Transfer of landfill operations from Coyote Canyon to the new Bee Canyon landfill necessitate relocation of this operation to a new site to be determined by the Supplemental EIS/EIR. Improvements to the operation will include addition of advanced windrow composting and utilization of larger windrows and turning devices. Sludge will be landfilled until sludge quality is improved. The new facility will be designed to serve all sanitation agencies in Orange County.

TABLE 5

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES
ADOPTED IN SELECTED PHASE II FACILITIES FOR
ORANGE COUNTY SANITATION DISTRICTS

ENVIRONMENTAL CONSIDERATIONS	IMPACT	MITIGATION
Geohydrology and Water Quality	No adverse impact on surface or groundwater quality at treatment plants. Supplemental EIS/EIR for offsite location.	Supplemental EIS/EIR for offsite location.
Air Quality	Increased emissions from combustion of greater amount of digester gas in existing internal combustion engines. Emissions from mobile sources and JPL-ACTS Demonstration.	Advanced air pollution control systems will be used on the JPL-ACTS Demonstration to achieve compliance with South Coast Air Quality Management District rules.
Terrestrial Biota	No adverse impact at treatment plants since no viable natural community, no rare or endangered species or migratory birds are contained within the plant sites.	Supplemental EIS/EIR for offsite location
Archaeological Sites	No adverse impact at treatment plants since field surveys have determined that none were present. Supplemental EIS/EIR for offsite location.	Supplemental EIS/EIR for offsite location
Land Use	No adverse impact at treatment plants. Supplemental EIS/EIR for offsite location.	Supplemental EIS/EIR for offsite location
Visual Character	No adverse impact at treatment plants. Supplemental EIS/EIR for offsite location.	Supplemental EIS/EIR for offsite location
Nuisances	No adverse impact at treatment plants. Supplemental EIS/EIR for offsite location.	Facilities design will incorporate systems to assure that nuisance conditions will not result beyond treatment plant boundaries. Supplemental EIS/EIR for offsite location.
Air Pollutants	Health concerns exist with regard to emissions from internal combustion engines at the treatment plants. No significant health risk from other emission sources.	Advanced air pollution control systems will be used on the JPL-ACTS and other thermal systems that may be installed in the future.
Heavy Metals	No adverse public health impact.	Landfill provides for containment. State-of-the-art particulate controls will be used on thermal processing systems. Aggresive pursuit of industrial pretreatment.
Trace Organics	No adverse public health impact.	Landfill provides for containment. Thermal process-destroys trace organics.
Pathogens	No adverse public health impact. Supplemental EIS/EIR for offsite location.	Landfill provides for containment. Proper composting provides destruction. A system of truck covers will be considered to minimize accidental spillage events. Supplemental EIS/EIR for offsite location.

TABLE 5 (CONTINUED)

SUMMARY OF ENVIRONMENTAL IMPACTS AND MITIGATION MEASURES ADOPTED IN SELECTED PHASE II FACILITIES FOR ORANGE COUNTY SANITATION DISTRICTS

ENVIRONMENTAL CONSIDERATIONS	IMPACT	MITIGATION
Transportation	No aggravation of congestion and/or vehicular conflicts on major arterials. Supplemental EIS/EIR for offsite location.	Supplemental EIS/EIR for offsite location
Waste Disposal System	No significant reduction in landfill capacity.	Supplemental EIS/EIR for offsite location
Wastewater Treatment System	No adverse impact from liquid sidestream recycle due to nature and low volume of the sidestreams.	
Water Supply System	No adverse impact on potable water supplies at treatment plants since secondary effluent is to be used to meet sludge processing needs. Supplemental EIS/EIR for offsite location.	Supplemental EIS/EIR for offsite location
Energy Systems	Recovery of energy by use of digester gas is beneficial. Additional electrical energy will be needed for sludge processing. Fuels for trucking operations and composting operations will be needed.	
Public Sector	Unavoidable adverse impact since a significant public investment for capital and operating costs is required.	Local capital funding requirements can be reduced if federal/state grant assistance is obtained.
Private Sector	Moderately significant regional benefits due to stimulation of economic activity.	
Employment	Regionally significant increase in employment opportunities during construction.	
Short-Term Use Vs. Long-Term	Potential for preclusion of beneficial uses at offsite location to be examined in Supplemental EIS/EIR. No preclusion of beneficial uses at treatment plants.	Landfilling of dried sludge minimizes public health implications associated with heavy metals and trace organics.
Irreversible Commitment of Resources	Public monetary expenditures, use of nonrenewable resources such as polymer for dewatering and diesel fuel for composting and trucking operations. Loss of biotic resources at the offsite location may occur and will be addressed in Supplemental EIS/EIR.	
Growth Inducing Impacts	No significant growth inducing impacts.	

AVAILABILITY OF LA/OMA PROJECT PUBLICATIONS

The following LA/OMA Project reports are available at the libraries listed at the conclusion of this section:

Final Environmental Impact Statement/Environmental Impact Report, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area, October 1980, and appendices thereto.

Draft Environmental Impact Statement/Environmental Impact Report, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area, April 1980, and appendices thereto.

Draft Facilities Plan/Program, Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area, April 1980, and appendices thereto.

Carver-Greenfield Process Evaluation, A Process for Sludge Drying, December, 1978.

Marketing Programs Designed for Sludge Management, August, 1979.

Sludge Exportation Study, August, 1978.

Initial Analysis of Candidate Systems and Preliminary Site Identification, April, 1977.

Sludge Processing and Disposal, A State of the Art Review, April, 1977.

Phase I Report, August, 1976.

Other LA/OMA Project publications are available prior to January 1, 1981 by writing to:

LA/OMA Project
P.O. Box 4998
1955 Workman Mill Road
Whittier, CA 90607

After January 1, 1981, requests for information on the LA/OMA Project and for LA/OMA Project reports should be directed to the individual operating agencies at the addresses identified in the abstract at the front of this document.

LIBRARIES RECEIVING
LA/OMA PROJECT PUBLICATIONS

Alhambra Public Library
410 W. Main St.
Alhambra, CA 91801

Chaffee College Library
5885 Hauen Ave.
Alta Loma, CA 91701

Anaheim Public Library
500 W. Broadway
Anaheim, CA 92805

Arcadia Public Library
20 W. Duarte Rd.
Arcadia, CA 91006

L.A. County Aboretum Library
301 N. Baldwin Ave.
Arcadia, CA 91006

Citrus College Library
18824 E. Foothill Blvd.
Azusa, CA 91702

Water Resources Center Archives
Room 40, North Gate Hall
University of California
Berkeley, CA 94720

Beverly Hills Library
444 N. Rexford Dr.
Beverly Hills, CA 90210

Buena Park Library
7150 La Palma Ave.
Buena Park, CA 90620

Burbank Public Library
110 N. Glenoaks Blvd.
Burbank, CA 91503

L.A. County Library
150 E. 216th St.
Carson, CA 90745

Cerritos Library
10825 Bloomfield Ave.
Cerritos, CA 90701

Commerce Library
5655 Jillson St.
Commerce, CA 90040

Sherman Foundation Library
614 Dahlia Ave.
Corona Del Mar, CA 92625

Orange Coast College Library
2701 Fairview Road
Costa Mesa, CA 92626

Covina Library
234 N. Second Ave.
Covina, CA 91723

Cypress College Library
9200 Valley View St.
Cypress, CA 90673

California State University Library
1000 E. Victoria St.
Dominguez Hills, CA 90247

Downey Library
8400 Third Street
Downey, CA 90241

El Segundo Library
111 W. Mariposa Ave.
El Segundo, CA 90245

Orange County Library
17565 Los Alamos
Fountain Vllaey, CA 92708

Fullerton Library
353 W. Commonwealth
Fullerton, CA 92632

Cal-State University Library
800 N. State College Drive
Fullerton, CA 92634

Orange County Library
11200 Stanford
Garden Grove, CA 92640

Claremont College Libraries
900 N. Dartmouth St.
Claremont, CA 91711

Glendora Library
140 S. Glendora Ave.
Glendora, CA 91740

L.A. County Library
12700 N. Grevillea Ave.
Hawthorne, CA 90250

Huntington Beach Library
525 Main St.
Huntington Beach, CA 92648

L.A. County Library
6518 Miles Ave.
Huntington Park, CA 90255

Inglewood Library
101 W. Manchester Blvd.
Inglewood, CA 90301

Government Publications Dept.
Main Library, University of Calif.
Campus Drive
Irvine, CA 92713

Newport-Irvine Waste Management
Planning Agency - Library
4920 Campus Drive
Irvine, CA 92713

Orange Co. Library
Civic Center
La Habra, CA 90631
La Habra, CA 90631

Orange Co. Library
363 Glenneyre
Laguna Beach, CA 92651

Leisure World-Laguna Hills Library
23532 Valencia
Laguna Hills, CA 92653

Orange Co. Library
33841 Niguel Rd.
Laguna Niguel, CA 92677

City of Glendale Library Dist.
222 E. Harvard St.
Glendale, CA 91205

Orange County Library
7842 Walker St.
La Palma, CA 90620

Cal State University Library
6101 E. Seventh St.
Long Beach, CA 90840

Long Beach Public Library
101 Pacific Ave.
Long Beach, CA 90802

Cal State University Library
5151 State University Drive
Los Angeles, CA 90032

USC Library
University Park
Los Angeles, CA 90007

Arch. & Urban Planning Library, UCLA
405 Hilgard Ave.
Los Angeles, CA 90024

Los Angeles Public Library
630 W. Fifth Street
Los Angeles, CA 90017

L.A. Municipal Reference Library
Room 530, City Hall East
200 N. Main St.
Los Angeles, CA 90012

USC - Seaver Science Library
920 W. 29th Street
Los Angeles, CA 90007

L.A. County Dept. Community Development
2999 W. 6th St.
Los Angeles, CA 90020

Cal State University Library
5151 State University Drive
Los Angeles, CA 90032

Antelope Valley College Library
3041 West Avenue K
Lancaster, CA 93534

L.A. County Library
44833 N. Fig Ave.
Lancaster, CA 93534

Regional Library Councils
964 Hall of Records
320 W. Temple St.
Los Angeles, CA 90012

Hughes Research Library
3011 Malibu Canyon Rd.
Malibu, CA 90265

Pepperdine University Library
25255 Pacific Coast Highway
Malibu, CA 90265

Orange County Library
24851 Chrisanta Drive
Mission Viejo, CA 92675

Monrovia Library
321 S. Myrtle Ave.
Monrovia, CA 91016

Newport Beach Library
2005 Dover Drive
Newport Beach, CA 92660

Cal State University Library
18111 Nordhoff St.
Northridge, CA.

L.A. County Library
South East Regional Headquarters
12348 E. Imperial Highway
Norwalk, CA 90650

Norwalk Library
12350 E. Imperial Highway
Norwalk, CA 90650

L.A. Planning Library
618 City Hall
Los Angeles, CA 90012

Environmental Protection Agency
L.A. Contact Office
300 N. Los Angeles St., Rm. 2037
Los Angeles, CA 90012

Placentia Library Dist.
411 E. Chapman Ave.
Placentia, CA 92670

Cal State Polytechnic University Library
3801 W. Temple Ave.
Pomona, CA 91768

Pomona Public Library
625 S. Garvey Ave.
Pomona, CA 91766

Riverside City Central Library
3581 Seventh St.
Riverside, CA 92501

Co. of Riverside Planning Dept.
4080 Lemon St.
Riverside, CA 92501

Government Publications Dept.
University of California Library
Canyon Crest Road
Riverside, CA 92507

University of California
Offices of Educational Services
Statewide Air Pollution Resource Center
900 University Ave.
Riverside, CA 92502

Office of Appropriate Technology
1530 10th St.
Sacramento, CA 95814

County San Bernardino Planning Dept.
316 Mt. View Ave.
San Bernardino, CA 92415

Orange Co. Public Library
431 City Drive, South
Orange, CA 92668

Orange Public Library
101 N. Center St.
Orange, CA 92666

Pasadena Public Library
285 E. Walnut St.
Pasadena, CA 91101

Environmental Engineering Library
(138-78)
136 Wm. Kech Lab
Cal Tech
Pasadena, CA 91125

San Marino Public Library
1890 Huntington Drive
San Marino, CA 91108

Santa Ana Public Library
26 Civic Center Plaza
Santa Ana, CA 92701

County of Orange
Environmental Management Agency
400 Civic Center Drive, West
Santa Ana, CA 92702

Santa Monica Public Library
1343 Sixth St.
Santa Monica, CA 90401

Orange County Library
2300 Beverly Manor Rd.
Seal Beach, CA 90740

Signal Hill Public Library
2175 Cherry Ave.
Signal Hill, CA 90806

Orange County Library
28192 Silverado Canyon Blvd.
Silverado, CA 92676

San Bernardino Association Governments
334 W. 3rd St.
San Bernardino, CA 92401

Orange County Library
233 Granada St.
San Clemente, CA 92672

Environmental Protection Agency
Region IX Library
213 Fremont St.
San Francisco, CA 94111

Orange County Library
31882 Camino Capistrano
San Juan Capistrano, CA 92675

Tustin Branch Library
Centennial at Main
Tustin, CA 92680

Los Angeles Valley College Library
5800 Fulton Ave.
Van Nuys, CA 91401

Pacific Bio-Marine Library
4134 Del Rey
Venice, CA 90291

Orange Co. Library
17865 Santiago Blvd.
Villa Park, CA 92667

Freedom of Information
EPA
Room 329
401 "M" Street, S.W.
Washington, D.C. 20460

L.A. County Library
1601 W. Covina Parkway
West Covina, CA 91790

Bonnie Bell Wardman Library
Whittier College
7031 Founders Hill Rd.
Whittier, CA 90608

South Pasadena Public Library
1115 E. Centro St.
South Pasadena, CA 91030

Orange County Library
79232 Cerritos
Stanton, CA 90680

Torrance Public Library
3301 Torrance Blvd.
Torrance, CA 90503

Honnold Library
Claremont, CA 91711

Whittier Public Library
7344 Washington Ave.
Whittier, CA 90602

Los Angeles Harbor College LIbrary
111 Figueroa Place
Wilmington, CA 90744

Los Angeles Pierce College Library
6201 Winnetka Ave.
Woodland Hills, CA 91364

NATIONAL TECHNICAL INFORMATION SERVICE

Major publications of the LA/OMA Project are entered into the National Technical Information Service of the U.S. Department of Commerce. To date, the following documents have been entered into the NTIS system:

Title	Accession No.
Marketing Programs Designed for Sludge Management (August 1979)	PB80124860
Carver Greenfield Process Evaluation -- A Process for Sludge Drying (December 1978)	PB296508/AS
Sludge Exportation Study (August 1978)	PB296452/AS
Assessment of Alternative Strategies for Sludge Disposal into Deep Basins off Southern California (September 1979)	PB80192990

The following documents will be entered into the NTIS system prior to completion of the LA/OMA Project:

- Sludge Processing and Disposal -- A State of the Art Review (April 1977)
- Initial Analysis of Candidate Systems and Prelinimary Site Identification (April 1977)
- EIS/EIR DRAFT and Appendices -- Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area (April 1980)

- Draft Facilities Plan/Program -- Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area (April 1980)

- Final EIS/EIR -- Sludge Management Program for the Los Angeles/Orange County Metropolitan Area (October 1980)

- Final Facilities Plan/Program and Summary of Final EIS/EIR -- Proposed Sludge Management Program for the Los Angeles/Orange County Metropolitan Area (October 1980)

Copies of reports may be obtained from NTIS by contacting:

U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, Virginia 22161